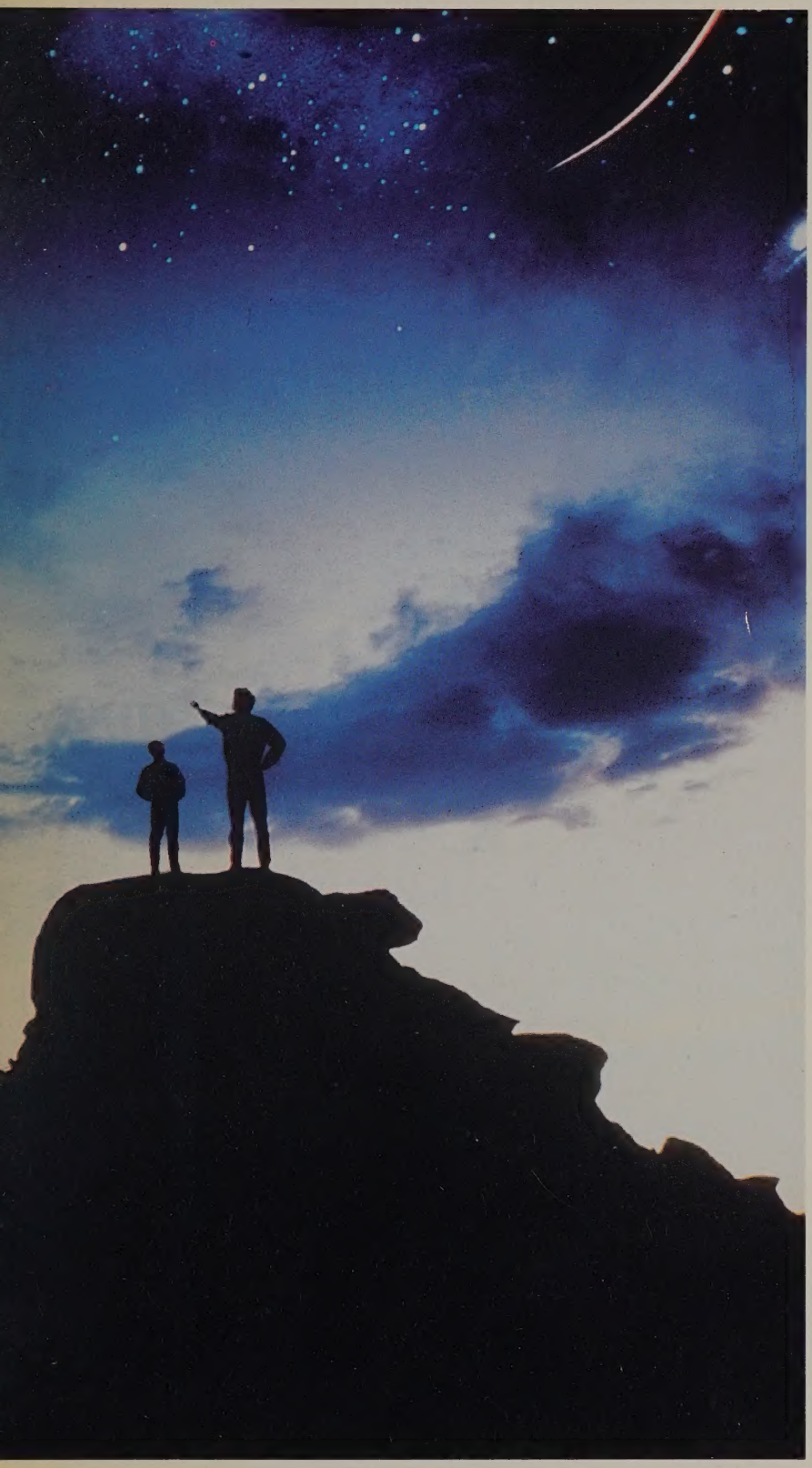


Product Selection Guide

No. 191

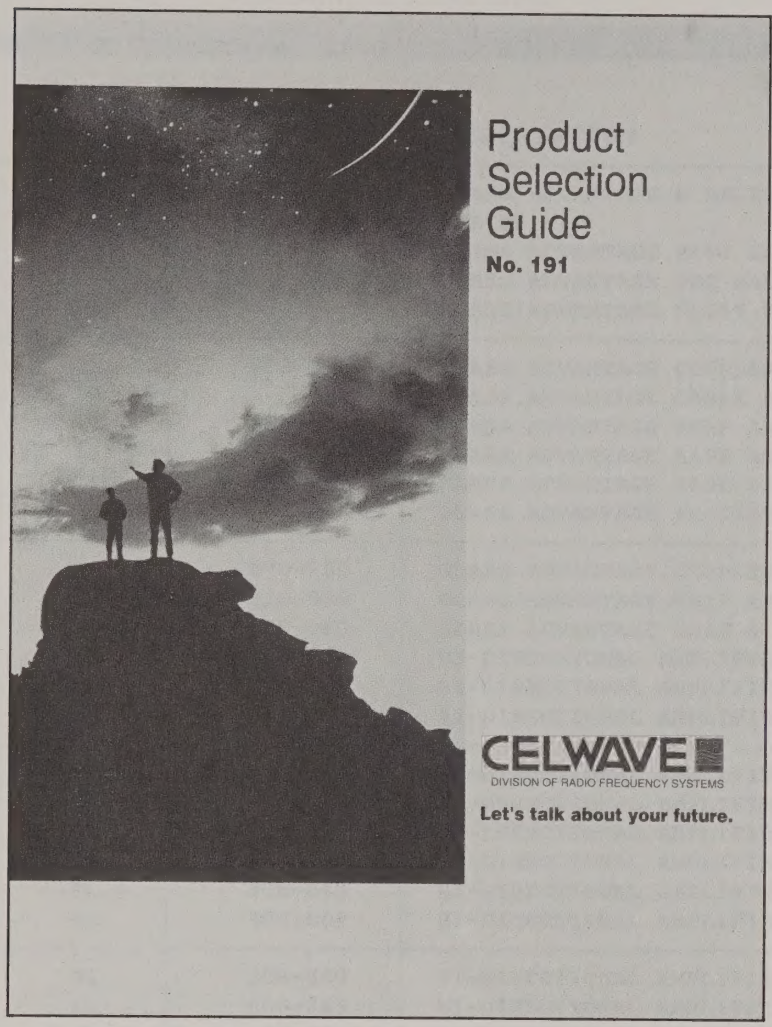
CELWAVE

DIVISION OF RADIO FREQUENCY SYSTEMS

Let's talk about your future.

Price List

Effective October 9, 1992



Product Selection Guide, Catalog 191

Mobile and Portable Antennas

Base Station Antennas

Transmission Line Products

Cavities

Duplexers and Filters

Receiver Multicouplers

Transmitter Combiners and System Components

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS
Route 79, Marlboro, NJ 07746
1-800-321-4700 • FAX: 615-641-1910

PHONE: 1-800-321-4700

CELWAVE

FAX: 1-615-641-1910

PRICE LIST EFFECTIVE October 9, 1992 **SUPERSEDES ALL PREVIOUS PRICE LIST**

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
032119900	19		GLASS ADVANTAGE N MALE CONNECTOR	7.00
044855900	299		CASTER KIT	21.00
14A0014002	19		GLASS ADVANTAGE MINI UHF CONNECTOR	3.00
14A0067	19		GLASS ADVANTAGE TNC MALE CONNECTOR	5.00
19A0130002	19		GLASS ADVANTAGE PL259 CONNECTOR	5.00
42008	19	806-896	GLASS ADVANTAGE COUPLER BOX ASSY	31.00
42020	19		GLASS ADVANTAGE CABLE ASSY	13.00
42022	19	806-896	GLASS ADVANTAGE WHIP ASSY	7.00
42055	19		GLASS ADVANTAGE BASE ASSY	14.00
42201	19	806-896	GLASS ADVANTAGE BASE & WHIP ASSY	21.00
42403	19		GLASS ADVANTAGE RE-INSTALL KIT	4.00
428850	19	870-960	GLASS ADVANTAGE COUPLER BOX ASSY	31.00
43095	19	870-960	GLASS ADVANTAGE WHIP ASSY	7.00
43096	19	870-960	GLASS ADVANTAGE BASE & WHIP ASSY	21.00
48500	NL	806-869	BI-DIRECTIONAL AMPLIFIER	9229.00
48500-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	9739.00
48501	NL	806-869	BI-DIRECTIONAL AMPLIFIER	8646.00
48501-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	9156.00
48502	NL	806-869	BI-DIRECTIONAL AMPLIFIER	10767.00
48502-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	11277.00
48503	NL	806-869	BI-DIRECTIONAL AMPLIFIER	10184.00
48503-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	10694.00
48504	NL	806-869	BI-DIRECTIONAL AMPLIFIER	11563.00
48504-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	12073.00
48505	NL	806-869	BI-DIRECTIONAL AMPLIFIER	10979.00
48505-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	11489.00
48506	NL	806-869	BI-DIRECTIONAL AMPLIFIER	12252.00
48506-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	12762.00
48507	NL	806-869	BI-DIRECTIONAL AMPLIFIER	11669.00
48507-N	NL	860-869	BI-DIRECTIONAL AMPLIFIER, NEMA	12179.00
48508	NL	806-869	BI-DIRECTIONAL AMPLIFIER	12995.00
48508-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	13505.00
48509	NL	806-869	BI-DIRECTIONAL AMPLIFIER	12411.00
48509-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	12921.00
48510	NL	806-869	BI-DIRECTIONAL AMPLIFIER	13790.00
48510-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	14300.00
48511	NL	806-869	BI-DIRECTIONAL AMPLIFIER	13154.00
48511-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	13664.00
48512	NL	806-869	BI-DIRECTIONAL AMPLIFIER	11138.00
48512-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	11648.00
48513	NL	806-869	BI-DIRECTIONAL AMPLIFIER	10555.00
48513-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	11065.00
48514	NL	806-869	BI-DIRECTIONAL AMPLIFIER	11881.00

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PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
48514-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	12391.00
48515	NL	806-869	BI-DIRECTIONAL AMPLIFIER	11351.00
48515-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	11861.00
48516	NL	806-869	BI-DIRECTIONAL AMPLIFIER	12730.00
48516-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	13240.00
48517	NL	806-869	BI-DIRECTIONAL AMPLIFIER	12093.00
48517-N	NL	806-869	BI-DIRECTIONAL AMPLIFIER, NEMA	12603.00
48518	NL	896-941	BI-DIRECTIONAL AMPLIFIER	12730.00
48518-N	NL	896-941	BI-DIRECTIONAL AMPLIFIER, NEMA	13240.00
507370	297	66-1000	GUARDIAN PMA 4Ax5T/2Ax10T	4726.00
507380	297	66-1000	GUARDIAN PMA 3Ax5T/1Ax15T	4200.00
507390	297	66-1000	GUARDIAN PMA 2Ax5T/1Ax10T	3570.00
507400	297	66-1000	GUARDIAN PMA 1Ax5T	2939.00
514542-001	168		ADAPTER KIT RD. MEMBER 1" - 2"	23.00
514542-002	168		ADAPTER KIT RD. MEMBER 2" - 3"	26.00
514542-003	168		ADAPTER KIT RD. MEMBER 3" - 4"	29.00
514542-004	168		ADAPTER KIT RD. MEMBER 4" - 5"	31.00
514542-005	168		ADAPTER KIT RD. MEMBER 5" - 6"	32.00
514542-006	168		ADAPTER KIT RD. MEMBER 6" - 7"	32.00
514608-003	NL		CEILING ADAPTER 3/8-16 X 12	20.00
514608-007	NL		CEILING ADAPTER 1/4-20 X 12	18.00
5BSR3A *P*	NL	850-940	FIVE 3 dB 220° CARDIOID	5197.00
5BSR3A-8A *P*	NL	850-940	FIVE 3 dB + ONE 8 dB 220° CARDIOID	6490.00
5BSR3B *P*	NL	850-940	FIVE 3 dB 140° CARDIOID	5197.00
5BSR3B-8B *P*	NL	850-940	FIVE 3 dB + ONE 8 dB 140° CARDIOID	6490.00
5BSR3C *P*	NL	850-940	FIVE 3 dB 60° SECTOR	5197.00
5BSR3C-8C *P*	NL	850-940	FIVE 3 dB + ONE 8 dB 60° SECTOR	6490.00
5BSR3H *P*	NL	850-940	FIVE 3 dB PEANUT	5197.00
5BSR3H-8H *P*	NL	850-940	FIVE 3 dB + ONE 8 dB PEANUT	6490.00
5BSR3O *P*	NL	850-940	FIVE 3 dB OMNI	5197.00
5BSR3O-8O *P*	NL	850-940	FIVE 3 dB + ONE 8 dB OMNI	6490.00
713737-002	169		CABLE GROUND STRAP 1/2" /KIT	24.00
713737-006	169		GROUND STRAP 3 & 3-1/2 /KIT	35.00
713796-005	169		CABLE GROUND STRAP 7/8" /KIT	30.00
713796-008	169		GROUND STRAP 1-1/4 & 1-5/8 /KIT	31.00
734701-000	151		TYPE N MALE CONN /LLFLEX 1/2	40.00
734710-000	151		TYPE N FEMALE CONN /LLFLEX 1/2	40.00
738200-000	159		N MALE CONNECTOR 1/2" AIR	111.00
738201-000	159		N FEMALE CONNECTOR 1/2" AIR	111.00
738204-000	159		SPLICE 1/2" AIR	235.00
738225-000	159		N MALE CONNECTOR 7/8" AIR	113.00
738226-000	159		N FEMALE CONNECTOR 7/8" AIR	113.00

P SEE PAGE 34 FOR AVAILABLE PENETRATOR OPTIONS

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
738229-000	159		EIA 7/8"(GB) 7/8" AIR	187.00
738230-000	159		EIA 7/8"(GP) 7/8" AIR	126.00
738231-000	159		SPLICE 7/8" AIR	155.00
738232-000	NL		END TERMINAL 7/8" AIR	255.50
738300-000	NL		N MALE CONNECTOR 1-5/8" AIR	286.00
738301-000	163		N FEMALE CONNECTOR 1-5/8" AIR	286.00
738303-000	163		EIA 1-5/8"(GB) 1-5/8" AIR	297.00
738304-000	NL		EIA 7/8" REDUCER(GB) 1-5/8" AIR	340.00
738305-000	163		SPLICE 1-5/8" AIR	386.00
738306-000	NL		END TERMINAL 1-5/8" AIR	428.00
738311-000	NL		EIA 7/8" REDUCER(GP) 1-5/8" AIR	299.00
738314-000	163		EIA 1-5/8"(GP) 1-5/8" AIR	255.00
738350-000	163		EIA 3-1/8"(GB) 3" AIR	479.00
738352-000	163		SPLICE 3" AIR	577.00
738355-000	163		EIA 3-1/8"(GP) 3" AIR	453.00
738801-000	153		TYPE N FEMALE CONNECTOR 1/2"	31.00
738802-000	153		TYPE N MALE CONNECTOR 1/2"	38.00
738803-000	153		UHF FEMALE CONNECTOR 1/2"	30.00
738804-000	153		UHF MALE CONNECTOR 1/2"	30.00
738806-000	153		SPLICE 1/2"	93.00
738807-000	NL		EIA 7/8"(GP) 1/2"	111.00
738835-000	NL		LC MALE CONNECTOR 7/8"	255.00
738841-000	153		TYPE N MALE CONNECTOR 7/8"	79.00
738842-000	153		TYPE N FEMALE CONNECTOR 7/8"	79.00
738843-000	153		UHF MALE CONNECTOR 7/8"	76.00
738844-000	153		UHF FEMALE CONNECTOR 7/8"	76.00
738845-000	NL		EIA 7/8"(GP) 7/8"	115.00
738846-000	153		SPLICE 7/8"	134.00
738847-000	NL		END TERMINAL 7/8"	207.00
738850-000	157		TYPE N MALE CONNECTOR 1-5/8"	268.00
738851-000	157		TYPE N FEMALE CONNECTOR 1-5/8"	268.00
738853-000	NL		EIA 1-5/8"(GP) 1-5/8"	278.00
738854-000	NL		EIA 7/8"(GP) 1-5/8"	309.00
738855-000	157		SPLICE 1-5/8"	376.00
738880-000	NL		EIA 7/8"(GP) 1-1/4"	221.00
738881-000	NL		EIA 1-5/8"(GP) 1-1/4"	221.00
738882-000	157		TYPE N MALE CONNECTOR 1-1/4"	149.00
738883-000	157		TYPE N FEMALE CONNECTOR 1-1/4"	149.00
738885-000	157		SPLICE 1-1/4"	324.00
738888-000	157		TYPE N MALE(GP) CONNECTOR 1-1/4"	361.00
738889-000	157		TYPE N FEMALE(GP) CONNECTOR 1-1/4"	402.00
810901-001	159		1/2" FLEXWELL AIR, HCC12-50J	4.00
810903-001	163		1-5/8" FLEXWELL AIR, HCC158-50J	16.00

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
810905-001	163		3" FLEXWELL AIR, HCC300-50J	28.00
810907-008	151		1/2" LLFLEX, HCF 12-50JCu2Y	4.00
810916-001	157		1-1/4" CELLFLEX FOAM, FLC114-50J	11.00
810916-007	NL		1-1/4" FIRE RETARDANT, FOAM CABLE	14.00
810918-001	153		1/2" CELLFLEX FOAM, FLC12-50J	3.00
810918-007	NL		1/2" FIRE RETARDANT, FOAM CABLE	3.18
810920-001	157		1-5/8" CELLFLEX FOAM, FLC158-50J	15.00
810920-007	NL		1-5/8" FIRE RETARDANT, FOAM CABLE	18.00
810921-001	153		7/8" CELLFLEX FOAM, FLC78-50J	6.00
810921-007	NL		7/8" FIRE RETARDANT, FOAM CABLE	8.00
810929-001	159		7/8" FLEXWELL AIR, HCC78-50J	8.00
910061-000	167		STRAPTITE KIT 100'	54.00
910303-000	169		CABLE HOISTING GRIP 1/2"	30.00
910307-000	169		CABLE HOISTING GRIP 7/8"	45.00
910311-000	169		CABLE HOIST GRIP 1-1/4" & 1-5/8"	53.00
920150-001	NL		INSULATED HANGERS 1/2"	40.00
920150-002	NL		INSULATED HANGERS 7/8"	40.00
920159-001	168		NON-INS. CABLE HANGER SLOT 1/2	40.00
920159-003	168		NON-INS. CABLE HANGER SLOT 1-5/8	50.00
920159-009	NL		NON-INS. CABLE HANGER SLOT 1-1/4	42.00
920161-003	NL		INSULATED HANGERS 1-5/8"	38.00
920161-009	NL		INSULATED HANGERS 1-1/4"	31.00
920167-001	168		ANGLE MEMBER ADPT KIT 1/2"	63.00
920167-004	168		ANGLE MEMBER ADPT KIT 7/8"- 3-1/8"	63.00
920241-000	170		ADAPTER, EIA to N-FEMALE 7/8"	113.00
920242-000	170		ADAPTER, EIA to N-FEMALE 1-5/8"	201.00
920243-000	170		ADAPTER, EIA to N-FEMALE 3-1/8"	319.00
920244-000	170		ADAPTER, EIA to LC-FEMALE 7/8"	155.00
920245-000	170		ADAPTER, EIA to LC-FEMALE 1-5/8"	211.00
920246-000	170		ADAPTER, EIA to LC-FEMALE 3-1/8"	680.00
920247-000	169		PLATE REDUCER 1-5/8" - 7/8"	206.00
920248-000	169		PLATE REDUCER 3-1/8" - 1-5/8"	249.00
920249-000	170		TAPER REDUCER 1-5/8" - 7/8"	131.00
920250-000	170		TAPER REDUCER 3-1/8" - 1-5/8"	216.00
920272-000	170		HARDWARE SET 7/8" 3/PER	4.10
920273-000	170		HARDWARE SET 1-5/8" 4/PER	8.00
920274-000	170		HARDWARE SET 3-1/8" 6/PER	10.00
920275-000	170		HARDWARE SET 6-1/8" 12/PER	21.00
920432-002	169		WALL/ROOF FEED THROUGH 1/2"	54.00
920433-000	169		WALL/ROOF FEED THROUGH 7/8"	52.00
920434-000	169		WALL/ROOF FEED THROUGH 1-5/8"	77.00
920691-003	168		NON-INS. CABLE HANGERS 1-5/8"	43.00
920867-000	169		WALL/ROOF FEED THROUGH 1-1/4"	67.00

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
920981-004	168		NON-INS. CABLE HANGERS SLOT 1-1/4"	42.00
920981-007	168		NON-INS. CABLE HANGERS SLOT 7/8	42.00
920981-010	168		NON-INS. CABLE HANGERS 7/8"	31.00
926222-000	170		HARDWARE SET 4-1/16" 8/PER	15.00
926285-000	170		HARDWARE SET 9-3/16" 20/PER	36.00
A-41234N	14	30-36	3/4" MOTOROLA MOUNT, 100W	78.00
A-41334N	14	36-42	3/4" MOTOROLA MOUNT, 100W	78.00
A-41434N	14	42-50	3/4" MOTOROLA MOUNT, 100W	78.00
A-41901	21		ADAPTOR MOTOROLA MT. TO BASE LOAD	12.00
A-41913	21		MOTOROLA STYLE MAGNET MOUNT	38.00
A-41918	21		3/4" MOTOROLA MOUNT EXACT RPL.	36.00
A-41936	21		MOTOROLA THICK ROOF MT. 17' COAX	31.00
A-42013	13	136-512	MINI-MAGNET MOUNT	34.00
A-42034N	13	136-512	3/4" MOTOROLA MOUNT	38.00
A-42054N	13	136-512	3/4" MOTOROLA MOUNT, WIDE BAND	46.00
A-42134N	15	130-174	3/4" MOTOROLA MOUNT, 100W 3 dB	78.00
A-42234N	15	138-174	3/4" MOTOROLA LOW PROFILE 3 dB	64.00
A-43434N	16	450-470	5 dB, 3/4" MOTOROLA MOUNT, 100W	63.00
A-44008	12	806-890	TRANSIT W/BNC, NO CABLE	60.00
A-44034	13,17	806-890	1/4 WAVE, 3/4" MOTOROLA MT. UNITY	47.00
A-44234	17	806-890	3 dB OPEN 3/4" MOTOROLA MOUNT	56.00
A8A/B8A-B1 *P*	NL	UHF+8or900	DUAL BAND 8 dB UHF + 8 dB 800 220°	6232.00
A8B/B8B-B1 *P*	NL	UHF+8or900	DUAL BAND 8 dB UHF + 8 dB 800 140°	6232.00
A8O/B8O-B1 *P*	NL	UHF+8or900	DUAL BAND 8 dB UHF + 8 dB 800 OMNI	6232.00
AF070-T	251	66-88	2ND HARMONIC FILTER, TUNABLE	87.00
AF150-T	251	136-174	2ND HARMONIC FILTER, TUNABLE	87.00
AF460-T	251	406-512	2ND HARMONIC FILTER, TUNABLE	83.00
AF800-T	251	806-960	2ND HARMONIC FILTER, TUNABLE	83.00
AGR6-A-B3 *P*	114	406-420	8.3 dB 220° CARDIOID	3708.00
AGR6-B-B3 *P*	114	406-420	10 dB 140° CARDIOID	3708.00
AGR6-O-B3 *P*	114	406-420	6 dB OMNI	3708.00
AGR8-A-B3 *P*	114	406-420	10.3 dB 220° CARDIOID	4017.00
AGR8-B-B3 *P*	114	406-420	12 dB 140° CARDIOID	4017.00
AGR8-O-B3 *P*	114	406-420	8 dB OMNI	4017.00
AGR8A-6A *P*	NL	406-420	DUAL 10.3 + 8.3 dB 220° CARDIOID	4985.00
AGR8B-6B *P*	NL	406-420	DUAL 12 + 10 dB 140° CARDIOID	4985.00
AGR8O-6O *P*	NL	406-420	DUAL 8 + 6 dB OMNI	4985.00
AGR9-A-B3 *P*	114	406-420	11.3 dB 220° CARDIOID	4326.00
AGR9-B-B3 *P*	114	406-420	13 dB 140° CARDIOID	4326.00
AGR9-O-B3 *P*	114	406-420	9 dB OMNI	4326.00
AHR10-A-B1 *P*	117	470-512	12.3 dB 220° CARDIOID	4326.00
AHR10-B-B1 *P*	117	470-512	14 dB 140° CARDIOID	4326.00

P SEE PAGE 34 FOR AVAILABLE PENETRATOR OPTIONS

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PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
AHR10-O-B1 *P*	117	470-512	10 dB OMNI	4326.00
AHR6-A-B1 *P*	117	470-512	8.3 dB 220° CARDIOID	3708.00
AHR6-B-B1 *P*	117	470-512	10 dB 140° CARDIOID	3708.00
AHR6-O-B1 *P*	117	470-512	6 dB OMNI	3708.00
AHR8-A-B1 *P*	117	470-512	10.3 dB 220° CARDIOID	4017.00
AHR8-B-B1 *P*	117	470-512	12 dB 140° CARDIOID	4017.00
AHR8-O-B1 *P*	117	470-512	8 dB OMNI	4017.00
AHR8A/6A-B1 *P*	NL	470-512	DUAL 10.3 + 8.3 dB 220° CARDIOID	4985.00
AHR8B/6B-B1 *P*	NL	470-512	DUAL 12 + 10 dB 140° CARDIOID	4985.00
AHR8O/6O-B1 *P*	NL	470-512	DUAL 8 + 6 dB OMNI	4985.00
AL001	253	25-1000	LOAD TERMINATION, 1 WATT	15.00
AL005	253	25-1000	LOAD TERMINATION, 5 WATT	32.00
AL015	253	25-1000	LOAD TERMINATION, 15 WATT	43.00
AL030	253	25-1000	LOAD TERMINATION, 30 WATT	80.00
ALR10-A-B1 *P*	117	450-482	12.3 dB 220° CARDIOID	4326.00
ALR10-B-B1 *P*	117	450-482	14 dB 140° CARDIOID	4326.00
ALR10-O-B1 *P*	117	450-482	10 dB OMNI	4326.00
ALR6-A-B1 *P*	117	450-482	8.3 dB 220° CARDIOID	3708.00
ALR6-B-B1 *P*	117	450-482	10 dB 140° CARDIOID	3708.00
ALR6-O-B1 *P*	117	450-482	6 dB OMNI	3708.00
ALR8-A-B1 *P*	117	450-482	10.3 dB 220° CARDIOID	4017.00
ALR8-B-B1 *P*	117	450-482	12 dB 140° CARDIOID	4017.00
ALR8-O-B1 *P*	117	450-482	8 dB OMNI	4017.00
ALR8A/6A-B1 *P*	NL	450-482	DUAL 10.3 + 8.3 dB 220° CARDIOID	4985.00
ALR8B/6B-B1 *P*	NL	450-482	DUAL 12 + 10 dB 140° CARDIOID	4985.00
ALR8O/6O-B1 *P*	NL	450-482	DUAL 8 + 6 dB OMNI	4985.00
B118B	9	118-127	HELICAL, BNC-M	17.00
B118H	9	118-127	HELICAL, 5/16-32 X 1/2 (M)	13.00
B118M	9	118-127	HELICAL, 12-28 (F)	13.00
B118T	9	118-127	HELICAL, TNC-M	17.00
B127B	9	127-136	HELICAL, BNC-M	17.00
B127H	9	127-136	HELICAL, 5/16-32 X 1/2 (M)	13.00
B127M	9	127-136	HELICAL, 12-28 (F)	13.00
B127T	9	127-136	HELICAL, TNC-M	17.00
B136B	9	136-144	HELICAL, BNC-M	17.00
B136H	9	136-144	HELICAL, 5/16-32 X 1/2	13.00
B136M	9	136-144	HELICAL, 12-28 (F)	13.00
B136T	9	136-144	HELICAL, TNC-M	17.00
B144B	9	144-148	HELICAL, BNC-M	17.00
B144H	9	144-148	HELICAL, 5/16-32 X 1/2	13.00
B144M	9	144-148	HELICAL, 12-28 (F)	13.00
B144T	9	144-148	HELICAL, TNC-M	17.00

P SEE PAGE 34 FOR AVAILABLE PENETRATOR OPTIONS

PHONE: 1-800-321-4700

CELWAVE

FAX: 1-615-641-1910

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
B148B	9	148-155	HELICAL, BNC-M	17.00
B148H	9	148-155	HELICAL, 5/16-32 X 1/2	13.00
B148M	9	148-155	HELICAL, 12-28 (F)	13.00
B148T	9	148-155	HELICAL, TNC-M	17.00
B155B	9	155-164	HELICAL, BNC-M	17.00
B155H	9	155-164	HELICAL, 5/16-32 X 1/2	13.00
B155M	9	155-164	HELICAL, 12-28 (F)	13.00
B155T	9	155-164	HELICAL, TNC-M	17.00
B164B	9	164-174	HELICAL, BNC-M	17.00
B164H	9	164-174	HELICAL, 5/16-32 X 1/2	13.00
B164M	9	164-174	HELICAL, 12-28 (F)	13.00
B164T	9	164-174	HELICAL, TNC-M	17.00
BA1010	45	146-174*	FIBERGLASS OMNIDIRECTIONAL	525.00
BA1012	45	118-174*	FIBERGLASS OMNIDIRECTIONAL	234.00
BA1312	45	149-171*	3 dB FIBERGLASS OMNIDIRECTIONAL	336.00
BA3010	35	68-88*	UNITY GAIN FIBERGLASS OMNIDIR.	708.00
BA6012	68	449-512*	FIBERGLASS OMNIDIRECTIONAL	234.00
BA6110	68	406-512*	1 dB FIBERGLASS OMNIDIRECTIONAL	567.00
BA6312	68	449-503*	3 dB FIBERGLASS OMNIDIRECTIONAL	347.00
BCR10-A-B1 *P*	123	824-894	12.3 dB 220° CARDIOID	3203.00
BCR10-B-B1 *P*	123	824-894	14 dB 140° CARDIOID	3203.00
BCR10-D-B1 *P*	123	824-894	14.3 dB 120° CARDIOID	3203.00
BCR10-H-B1 *P*	123	824-894	13.4 dB PEANUT	3203.00
BCR10-O-B1 *P*	123	824-894	10 dB OMNI	3203.00
BCR10A/8A-B1*P*	132	824-894	DUAL 12.3 + 10.3 dB 220° CARDIOID	5804.00
BCR10B/8B-B1*P*	132	824-894	DUAL 14 + 12 dB 140° CARDIOID	5804.00
BCR10D/8D-B1*P*	132	824-894	DUAL 14.3 + 12.3 dB 120° CARDIOID	5804.00
BCR10H/8H-B1*P*	132	824-894	DUAL 13.4 + 11.4 dB PEANUT	5804.00
BCR10O/8O-B1*P*	132	824-894	DUAL 10 + 8 dB OMNI	5804.00
BCR12-A-B1 *P*	123	824-894	14.3 dB 220° CARDIOID	5804.00
BCR12-B-B1 *P*	123	824-894	16 dB 140° CARDIOID	5804.00
BCR12-D-B1 *P*	123	824-894	16.3 dB 120° CARDIOID	5804.00
BCR12-H-B1 *P*	123	824-894	15.4 dB PEANUT	5804.00
BCR12-O-B1 *P*	123	824-894	12 dB OMNI	5804.00
BCR6-A-B1 *P*	120	824-894	8.3 dB 220° CARDIOID	2575.00
BCR6-B-B1 *P*	120	824-894	10 dB 140° CARDIOID	2575.00
BCR6-D-B1 *P*	120	824-894	10.3 dB 120° CARDIOID	2575.00
BCR6-H-B1 *P*	120	824-894	9.4 dB PEANUT	2575.00
BCR6-O-B1 *P*	120	824-894	6 dB OMNI	2575.00
BCR8-A-B1 *P*	120	824-894	10.3 dB 220° CARDIOID	3203.00

* ADD DASH # TO MODEL NUMBER FOR FREQ. BANDS

P SEE PAGE 34 FOR AVAILABLE PENETRATOR OPTIONS

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
BCR8-B-B1 *P*	120	824-894	12 dB 140° CARDIOID	3203.00
BCR8-D-B1 *P*	120	824-894	12.3 dB 120° CARDIOID	3203.00
BCR8-H-B1 *P*	120	824-894	11.4 dB PEANUT	3203.00
BCR8-O-B1 *P*	120	824-894	8 dB OMNI	3203.00
BCR8A/6A-B1 *P*	129	824-894	DUAL 10.3 + 8.3 dB 220° CARDIOID	3811.00
BCR8B/6B-B1 *P*	129	824-894	DUAL 12 + 10 dB 140° CARDIOID	3811.00
BCR8D/6D-B1 *P*	129	824-894	DUAL 12.3 + 10.3 dB 120° CARDIOID	3811.00
BCR8H/6H-B1 *P*	129	824-894	DUAL 11.4 + 9.4 dB PEANUT	3811.00
BCR8O/6O-B1 *P*	129	824-894	DUAL 8 + 6 dB OMNI	3811.00
BL060D	253	25-1000	LOAD TERMINATION, 60 WATT, N-MALE	106.00
BL060DF	253	25-1000	LOAD TERMINATION, 60 WATT N-FEMALE	106.00
BL060DS	253	25-1000	LOAD TERM, 60 WATT, N-MALE, SENSED	133.00
BL060E	NL	25-1000	LOAD TERMINATION, 60 WATT	106.00
BL060G	NL	25-1000	LOAD TERM, 60W (TJ/TL COMBINER)	106.00
BL060H	NL	25-1000	LOAD TERM, 60W (SJ COMBINERS)	106.00
BMR10-A-B1 *P*	123	806-869	12.3 dB 220° CARDIOID	3203.00
BMR10-B-B1 *P*	123	806-869	14 dB 140° CARDIOID	3203.00
BMR10-D-B1 *P*	123	806-869	14.3 dB 120° CARDIOID	3203.00
BMR10-H-B1 *P*	123	806-869	13.4 dB PEANUT	3203.00
BMR10-O-B1 *P*	123	806-869	10 dB OMNI	3203.00
BMR10A/8A-B1*P*	132	806-869	DUAL 12.3 + 10.3 dB 220° CARDIOID	5804.00
BMR10B/8B-B1*P*	132	806-869	DUAL 14 + 12 dB 140° CARDIOID	5804.00
BMR10D/8D-B1*P*	132	806-869	DUAL 14.3 + 12.3 dB 120° CARDIOID	5804.00
BMR10H/8H-B1*P*	132	806-869	DUAL 13.4 + 11.4 dB PEANUT	5804.00
BMR10O/8O-B1*P*	132	806-869	DUAL 10 + 8 dB OMNI	5804.00
BMR12-A-B1 *P*	123	806-869	14.3 dB 220° CARDIOID	5804.00
BMR12-B-B1 *P*	123	806-869	16 dB 140° CARDIOID	5804.00
BMR12-D-B1 *P*	123	806-869	16.3 dB 120° CARDIOID	5804.00
BMR12-H-B1 *P*	123	806-869	15.4 dB PEANUT	5804.00
BMR12-O-B1 *P*	123	806-869	12 dB OMNI	5804.00
BMR6-A-B1 *P*	120	806-869	8.3 dB 220° CARDIOID	2575.00
BMR6-B-B1 *P*	120	806-869	10 dB 140° CARDIOID	2575.00
BMR6-D-B1 *P*	120	806-869	10.3 dB 120° CARDIOID	2575.00
BMR6-H-B1 *P*	120	806-869	9.4 dB PEANUT	2575.00
BMR6-O-B1 *P*	120	806-869	6 dB OMNI	2575.00
BMR8-A-B1 *P*	120	806-869	10.3 dB 220° CARDIOID	3203.00
BMR8-B-B1 *P*	120	806-869	12 dB 140° CARDIOID	3203.00
BMR8-D-B1 *P*	120	806-869	12.3 dB 120° CARDIOID	3203.00
BMR8-H-B1 *P*	120	806-869	11.4 dB PEANUT	3203.00
BMR8-O-B1 *P*	120	806-869	8 dB OMNI	3203.00
BMR8A/6A-B1 *P*	129	806-869	DUAL 10.3 + 8.3 dB 220° CARDIOID	3811.00
BMR8B/6B-B1 *P*	129	806-869	DUAL 12 + 10 dB 140° CARDIOID	3811.00

P SEE PAGE 34 FOR AVAILABLE PENETRATOR OPTIONS

PRICE LIST EFFECTIVE October 9, 1992 **SUPERSEDES ALL PREVIOUS PRICE LIST**

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
BMR8D/6D-B1 *P*	129	806-869	DUAL 12.3 + 10.3 dB 120° CARDIOID	3811.00
BMR8H/6H-B1 *P*	129	806-869	DUAL 11.4 + 9.4 dB PEANUT	3811.00
BMR8O/6O-B1 *P*	129	806-869	DUAL 8 + 6 dB OMNI	3811.00
BMSL10-A-B1 *P*	126	806-906	12.3 dB 220° CARDIOID	3203.00
BMSL10-B-B1 *P*	126	806-906	14 dB 140° CARDIOID	3203.00
BMSL10-D-B1 *P*	126	806-906	14.3 dB 120° CARDIOID	3203.00
BMSL10-H-B1 *P*	126	806-906	13.4 dB PEANUT	3203.00
BMSL10-O-B1 *P*	126	806-906	10 dB OMNI	3203.00
BMSL12-A-B1 *P*	126	806-906	14.3 dB 220° CARDIOID	5804.00
BMSL12-B-B1 *P*	126	806-906	16 dB 140° CARDIOID	5804.00
BMSL12-D-B1 *P*	126	806-906	16.3 dB 120° CARDIOID	5804.00
BMSL12-H-B1 *P*	126	806-906	15.4 dB PEANUT	5804.00
BMSL12-O-B1 *P*	126	806-906	12 dB OMNI	5804.00
BMSU10-A-B1 *P*	126	850-960	12.3 dB 220° CARDIOID	3203.00
BMSU10-B-B1 *P*	126	850-960	14 dB 140° CARDIOID	3203.00
BMSU10-D-B1 *P*	126	850-960	14.3 dB 120° CARDIOID	3203.00
BMSU10-H-B1 *P*	126	850-960	13.4 dB PEANUT	3203.00
BMSU10-O-B1 *P*	126	850-960	10 dB OMNI	3203.00
BMSU12-A-B1 *P*	126	850-960	14.3 dB 220° CARDIOID	5804.00
BMSU12-B-B1 *P*	126	850-960	16 dB 140° CARDIOID	5804.00
BMSU12-D-B1 *P*	126	850-960	16.3 dB 120° CARDIOID	5804.00
BMSU12-H-B1 *P*	126	850-960	15.4 dB PEANUT	5804.00
BMSU12-O-B1 *P*	126	850-960	12 dB OMNI	5804.00
BPR10-A-B1 *P*	123	928-960	12.3 dB 220° CARDIOID	3203.00
BPR10-B-B1 *P*	123	928-960	14 dB 140° CARDIOID	3203.00
BPR10-D-B1 *P*	123	928-960	14.3 dB 120° CARDIOID	3203.00
BPR10-H-B1 *P*	123	928-960	13.4 dB PEANUT	3203.00
BPR10-O-B1 *P*	123	928-960	10 dB OMNI	3203.00
BPR10A/8A-B1*P*	132	928-960	DUAL 12.3 + 10.3 dB 220° CARDIOID	5804.00
BPR10B/8B-B1*P*	132	928-960	DUAL 14 + 12 dB 140° CARDIOID	5804.00
BPR10D/8D-B1*P*	132	928-960	DUAL 14.3 + 12.3 dB 120° CARDIOID	5804.00
BPR10H/8H-B1*P*	132	928-960	DUAL 13.4 + 11.4 dB PEANUT	5804.00
BPR10O/8O-B1*P*	132	928-960	DUAL 10 + 8 dB OMNI	5804.00
BPR12-A-B1 *P*	123	928-960	14.3 dB 220° CARDIOID	5804.00
BPR12-B-B1 *P*	123	928-960	16 dB 140° CARDIOID	5804.00
BPR12-D-B1 *P*	123	928-960	16.3 dB 120° CARDIOID	5804.00
BPR12-H-B1 *P*	123	928-960	15.4 dB PEANUT	5804.00
BPR12-O-B1 *P*	123	928-960	12 dB OMNI	5804.00
BPR6-A-B1 *P*	120	928-960	8.3 dB 220° CARDIOID	2575.00
BPR6-B-B1 *P*	120	928-960	10 dB 140° CARDIOID	2575.00
BPR6-D-B1 *P*	120	928-960	10.3 dB 120° CARDIOID	2575.00
BPR6-H-B1 *P*	120	928-960	9.4 dB PEANUT	2575.00

P SEE PAGE 34 FOR AVAILABLE PENETRATOR OPTIONS

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
BPR6-O-B1 *P*	120	928-960	6 dB OMNI	2575.00
BPR8-A-B1 *P*	120	928-960	10.3 dB 220° CARDIOID	3203.00
BPR8-B-B1 *P*	120	928-960	12 dB 140° CARDIOID	3203.00
BPR8-D-B1 *P*	120	928-960	12.3 dB 120° CARDIOID	3203.00
BPR8-H-B1 *P*	120	928-960	11.4 dB PEANUT	3203.00
BPR8-O-B1 *P*	120	928-960	8 dB OMNI	3203.00
BPR8A/6A-B1 *P*	129	928-960	DUAL 10.3 + 8.3 dB 220° CARDIOID	3811.00
BPR8B/6B-B1 *P*	129	928-960	DUAL 12 + 10 dB 140° CARDIOID	3811.00
BPR8D/6D-B1 *P*	129	928-960	DUAL 12.3 + 10.3 dB 120° CARDIOID	3811.00
BPR8H/6H-B1 *P*	129	928-960	DUAL 11.4 + 9.4 dB PEANUT	3811.00
BPR8O/6O-B1 *P*	129	928-960	DUAL 8 + 6 dB OMNI	3811.00
C406B	10	406-420	HELICAL, BNC-M	17.00
C406H	10	406-420	HELICAL, 5/16-32 X 1/2	13.00
C406T	10	406-420	HELICAL, TNC-M	17.00
C406X	10	406-420	HELICAL, 1/4-32 X 3/16	13.00
C420B	10	420-450	HELICAL, BNC-M	17.00
C420H	10	420-450	HELICAL, 5/16-32 X 1/2	13.00
C420T	10	420-450	HELICAL, TNC-M	17.00
C420X	10	420-450	HELICAL, 1/4-32 X 3/16	13.00
C450B	10	450-470	HELICAL, BNC-M	17.00
C450H	10	450-470	HELICAL, 5/16-32 X 1/2	13.00
C450T	10	450-470	HELICAL, TNC-M	17.00
C450X	10	450-470	HELICAL, 1/4-32 X 3/16	13.00
C470B	10	470-512	HELICAL, BNC-M	17.00
C470H	10	470-512	HELICAL, 5/16-32 X 1/2	13.00
C470T	10	470-512	HELICAL, TNC-M	17.00
C470X	10	470-512	HELICAL, 1/4-32 X 3/16	13.00
CAB-1	NL		CABLE SET	90.00
CC078-0	255	66-88	CIRCULATOR, ONLY	340.00
CC078-A	255	66-88	ISOLATOR, 15 WATT LOAD	381.00
CC078-AA	255	66-88	ISOLATOR, 30 WATT LOAD	419.00
CC078-B	255	66-88	ISOLATOR, 60 WATT LOAD	446.00
CC078-C	255	66-88	ISOLATOR, 150 WATT LOAD	578.00
CC078-S	255	66-88	ISOLATOR, 60 WATT LOAD SENSED	472.00
CC150-0	257	136-174	CIRCULATOR, ONLY	340.00
CC150-A	257	136-174	ISOLATOR, 15 WATT LOAD	381.00
CC150-AA	257	136-174	ISOLATOR, 30 WATT LOAD	419.00
CC150-B	257	136-174	ISOLATOR, 60 WATT LOAD	446.00
CC150-C	257	136-174	ISOLATOR, 150 WATT LOAD	578.00
CC150-S	257	136-174	ISOLATOR, 60 WATT LOAD SENSED	472.00
CC280-0	257	250-285	CIRCULATOR, ONLY	340.00
CC280-A	257	250-285	ISOLATOR, 15 WATT LOAD	381.00

P SEE PAGE 34 FOR AVAILABLE PENETRATOR OPTIONS

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
CC280-AA	257	250-285	ISOLATOR, 30 WATT LOAD	419.00
CC280-B	257	250-285	ISOLATOR, 60 WATT LOAD	446.00
CC280-C	257	250-285	ISOLATOR, 150 WATT LOAD	578.00
CC280-H	257	250-285	ISOLATOR, 300 WATT LOAD	775.00
CC280-S	257	250-285	ISOLATOR, 60 WATT LOAD SENSED	472.00
CC460-0	259	406-512	CIRCULATOR, ONLY	340.00
CC460-A	259	406-512	ISOLATOR, 15 WATT LOAD	381.00
CC460-AA	259	406-512	ISOLATOR, 30 WATT LOAD	419.00
CC460-B	259	406-512	ISOLATOR, 60 WATT LOAD	446.00
CC460-C	259	406-512	ISOLATOR, 150 WATT LOAD	578.00
CC460-S	259	406-512	ISOLATOR, 60 WATT LOAD SENSED	472.00
CC870-0	261	806-1000	CIRCULATOR, ONLY	255.00
CC870-A	261	806-1000	ISOLATOR, 15 WATT LOAD	297.00
CC870-AA	261	806-1000	ISOLATOR, 30 WATT LOAD	335.00
CC870-B	261	806-1000	ISOLATOR, 60 WATT LOAD	361.00
CC870-C	261	806-1000	ISOLATOR, 150 WATT LOAD	494.00
CC870-S	261	806-1000	ISOLATOR, 60 WATT LOAD SENSED	388.00
CD078-0	255	66-88	CIRCULATOR, ONLY	658.00
CD078-A	255	66-88	ISOLATOR, 15 & 15 WATT LOAD	700.00
CD078-AA	255	66-88	ISOLATOR, 15 & 30 WATT LOAD	737.00
CD078-B	255	66-88	ISOLATOR, 15 & 60 WATT LOAD	764.00
CD078-C	255	66-88	ISOLATOR, 15 & 150 WATT LOAD	897.00
CD078-S	255	66-88	ISOLATOR, 15 & 60 WATT LOAD SENSED	791.00
CD150-0	257	136-174	CIRCULATOR, ONLY	658.00
CD150-A	257	136-174	ISOLATOR, 15 & 15 WATT LOAD	700.00
CD150-AA	257	136-174	ISOLATOR, 15 & 30 WATT LOAD	737.00
CD150-B	257	136-174	ISOLATOR, 15 & 60 WATT LOAD	764.00
CD150-C	257	136-174	ISOLATOR, 15 & 150 WATT LOAD	897.00
CD150-S	257	136-174	ISOLATOR, 15 & 60 WATT LOAD SENSED	791.00
CD280-0	257	250-285	CIRCULATOR, ONLY	658.00
CD280-A	257	250-285	ISOLATOR, 15 & 15 WATT LOAD	700.00
CD280-AA	257	250-285	ISOLATOR, 15 & 30 WATT LOAD	737.00
CD280-B	257	250-285	ISOLATOR, 15 & 60 WATT LOAD	764.00
CD280-C	257	250-285	ISOLATOR, 15 & 150 WATT LOAD	897.00
CD280-H	257	250-285	ISOLATOR, 15 & 300 WATT LOAD	1109.00
CD280-S	257	250-285	ISOLATOR, 15 & 60 WATT LOAD SENSED	791.00
CD460-0	259	406-512	CIRCULATOR, ONLY	658.00
CD460-A	259	406-512	ISOLATOR, 15 & 15 WATT LOAD	700.00
CD460-AA	259	406-512	ISOLATOR, 15 & 30 WATT LOAD	737.00
CD460-B	259	406-512	ISOLATOR, 15 & 60 WATT LOAD	764.00
CD460-C	259	406-512	ISOLATOR, 15 & 150 WATT LOAD	897.00
CD460-S	259	406-512	ISOLATOR, 15 & 60 WATT LOAD SENSED	791.00
CD870-0	261	806-1000	CIRCULATOR, ONLY	494.00

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
CD870-A	261	806-1000	ISOLATOR, 15 & 15 WATT LOAD	536.00
CD870-AA	261	806-1000	ISOLATOR, 15 & 30 WATT LOAD	573.00
CD870-B	261	806-1000	ISOLATOR, 15 & 60 WATT LOAD	600.00
CD870-C	261	806-1000	ISOLATOR, 15 & 150 WATT LOAD	732.00
CD870-H	261	806-1000	ISOLATOR, 15 & 300 WATT LOAD	908.00
CD870-S	261	806-1000	ISOLATOR, 15 & 60 WATT LOAD SENSED	626.00
CEL-1	103	825-890	ADMIRAL 2' 3 dB CELLULAR ANTENNA	149.00
CEL-1A	103	806-866	ADMIRAL 2' 3 dB CELLULAR ANTENNA	149.00
CEL-3	103	825-890	ADMIRAL 8' 6 dB CELLULAR ANTENNA	303.00
CEL-3A	103	806-866	ADMIRAL 8' 6 dB CELLULAR ANTENNA	303.00
CFX836-6N	213	824-846.5	CELLULAR PRESELECTOR	244.00
CFX836-6W	NL	824-849	CELLULAR PRESELECTOR	244.00
CFX836-8N	213	824-846.5	CELLULAR PRESELECTOR	270.00
CFX836-8W	213	824-849	CELLULAR PRESELECTOR	270.00
CFX842-6	213	835-849	CELLULAR PRESELECTOR	244.00
CFX842-8	213	835-849	CELLULAR PRESELECTOR	270.00
CL150-D	253	25-1000	LOAD TERMINATION, 150 WATT	239.00
CL150-P	253	25-1000	LOAD TERMINATION, 150 WATT, SENSED	239.00
CT078-0	255	66-88	CIRCULATOR, ONLY	976.00
CT078-A	255	66-88	ISOLATOR, 15 & 15 & 15 WATT LOAD	1018.00
CT078-AA	255	66-88	ISOLATOR, 15 & 15 & 30 WATT LOAD	1056.00
CT078-B	255	66-88	ISOLATOR, 15 & 15 & 60 WATT LOAD	1082.00
CT078-C	255	66-88	ISOLATOR, 15 & 15 & 150 WATT LOAD	1215.00
CT078-S	255	66-88	ISOLATOR, 15 & 15 & 60 W LOAD SENS	1109.00
CT150-0	257	136-174	CIRCULATOR, ONLY	976.00
CT150-A	257	136-174	ISOLATOR, 15 & 15 & 15 WATT LOAD	1018.00
CT150-AA	257	136-174	ISOLATOR, 15 & 15 & 30 WATT LOAD	1056.00
CT150-B	257	136-174	ISOLATOR, 15 & 15 & 60 WATT LOAD	1082.00
CT150-C	257	136-174	ISOLATOR, 15 & 15 & 150 WATT LOAD	1215.00
CT150-S	257	136-174	ISOLATOR, 15 & 15 & 60 W LOAD SENS	1109.00
CT460-0	259	406-512	CIRCULATOR, ONLY	976.00
CT460-A	259	406-512	ISOLATOR, 15 & 15 & 15 WATT LOAD	1018.00
CT460-AA	259	406-512	ISOLATOR, 15 & 15 & 30 WATT LOAD	1056.00
CT460-B	259	406-512	ISOLATOR, 15 & 15 & 60 WATT LOAD	1082.00
CT460-C	259	406-512	ISOLATOR, 15 & 15 & 150 WATT LOAD	1215.00
CT460-S	259	406-512	ISOLATOR, 15 & 15 & 60 W LOAD SENS	1109.00
CT870-0	261	806-1000	CIRCULATOR,ONLY	732.00
CT870-A	261	806-1000	ISOLATOR, 15 & 15 & 15 WATT LOAD	774.00
CT870-AA	261	806-1000	ISOLATOR, 15 & 15 & 30 WATT LOAD	812.00
CT870-B	261	806-1000	ISOLATOR, 15 & 15 & 60 WATT LOAD	838.00
CT870-C	261	806-1000	ISOLATOR, 15 & 15 & 150 WATT LOAD	971.00
CT870-S	261	806-1000	ISOLATOR, 15 & 15 & 60 W LOAD SENS	865.00
D406B	10	406-420	1/4 WHIP, BNC-M	17.00

PHONE: 1-800-321-4700

CELWAVE

FAX: 1-615-641-1910

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
D406H	10	406-420	1/4 WHIP, 5/16-32 X 1/2	13.00
D406T	10	406-420	1/4 WHIP, TNC-M	17.00
D406X	10	406-420	1/4 WHIP, 1/4-32 X 3/16	13.00
D420B	10	420-450	1/4 WHIP, BNC-M	17.00
D420H	10	420-450	1/4 WHIP, 5/16-32 X 1/2	13.00
D420T	10	420-450	1/4 WHIP, TNC-M	17.00
D420X	10	420-450	1/4 WHIP, 1/4-32 X 3/16	13.00
D450B	10	450-470	1/4 WHIP, BNC-M	17.00
D450H	10	450-470	1/4 WHIP, 5/16-32 X 1/2	13.00
D450T	10	450-470	1/4 WHIP, TNC-M	17.00
D450X	10	450-470	1/4 WHIP, 1/4-32 X 3/16	13.00
D470B	10	470-512	1/4 WHIP, BNC-M	17.00
D470H	10	470-512	1/4 WHIP, 5/16-32 X 1/2	13.00
D470T	10	470-512	1/4 WHIP, TNC-M	17.00
D470X	10	470-512	1/4 WHIP, 1/4-32 X 3/16	13.00
DCG1-070	297	66-88	GUARDIAN SINGLE DIREC. COUPLER	145.00
DCG1-150	297	132-174	GUARDIAN SINGLE DIREC. COUPLER	145.00
DCG1-460	297	406-512	GUARDIAN SINGLE DIREC. COUPLER	145.00
DCG1-800	297	800-1000	GUARDIAN SINGLE DIREC. COUPLER	145.00
DCG2-070	297	66-88	GUARDIAN DUAL DIREC. COUPLER	167.00
DCG2-150	297	132-174	GUARDIAN DUAL DIREC. COUPLER	167.00
DCG2-460	297	406-512	GUARDIAN DUAL DIREC. COUPLER	167.00
DCG2-800	297	800-1000	GUARDIAN DUAL DIREC. COUPLER	167.00
E806S	11	806-866	TRUNKING 1/4 WHIP, SMA-F	26.00
E806T	11	806-866	TRUNKING 1/4 WHIP, TNC-M	26.00
E821S	11	821-896	CELLULAR 1/4 WHIP, SMA-F	26.00
E821T	11	821-896	CELLULAR 1/4 WHIP, TNC-M	26.00
F806S	11	806-866	TRUNKING 1/2 WHIP, SMA-F	30.00
F821B	11	821-896	CELLULAR 1/2 WHIP, BNC-M	30.00
F821S	11	821-896	CELLULAR 1/2 WHIP, SMA-F	30.00
F821T	11	821-896	CELLULAR 1/2 WHIP, TNC-M	30.00
G806B	11	806-866	TRUNKING DIPOLE, BNC-M	39.00
G806S	11	806-866	TRUNKING DIPOLE, SMA-F	39.00
G821B	11	821-896	CELLULAR DIPOLE, BNC-M	39.00
G821L	NL	824-894	CELLULAR DIPOLE, TNC SWIVEL	39.00
G821R	11	800-960	CELLULAR DIPOLE, RT. ANGLE TNC-M	39.00
G821S	11	821-896	CELLULAR DIPOLE, SMA-F	39.00
G821T	11	821-896	CELLULAR DIPOLE, TNC-M	39.00
HC078-0	255	66-88	CIRCULATOR, ONLY HIGH POWER	1273.00
HC078-B	255	66-88	ISOLATOR, 60 WATT LOAD H/P	1406.00
HC078-C	255	66-88	ISOLATOR, 150 WATT LOAD H/P	1512.00
HC078-H	255	66-88	ISOLATOR, 300 WATT LOAD H/P	1724.00
HC078-S	255	66-88	SOLATOR, 60W LOAD SENSED H/P	1406.00

PHONE: 1-800-321-4700

CELWAVE

FAX: 1-615-641-1910

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
HC150-0	257	136-174	CIRCULATOR, ONLY HIGH POWER	1299.00
HC150-AA	257	136-174	ISOLATOR, HIGH POWER, 30 WATT	1379.00
HC150-B	257	136-174	ISOLATOR, HIGH POWER, 60 WATT	1406.00
HC150-C	257	136-174	ISOLATOR, HIGH POWER, 150 WATT	1538.00
HC150-H	257	136-174	ISOLATOR, HIGH POWER, 300 WATT	1750.00
HC150-S	257	136-174	ISOLATOR, HIGH POWER, 60 W SENSD	1432.00
HC460-0	259	406-512	CIRCULATOR, ONLY HIGH POWER	690.00
HC460-AA	259	406-512	ISOLATOR, HIGH POWER, 30W LOAD	769.00
HC460-B	259	406-512	ISOLATOR, HIGH POWER, 60W LOAD	796.00
HC460-C	259	406-512	ISOLATOR, HIGH POWER, 150W LOAD	928.00
HC460-H	259	406-512	ISOLATOR, HIGH POWER, 300W LOAD	1140.00
HC460-S	259	406-512	ISOLATOR, H/P, 60W LOAD SENSED	822.00
HC800-0	261	806-1000	CIRCULATOR, ONLY HIGH POWER	514.00
HC800-AA	261	806-1000	ISOLATOR, HIGH POWER, 30W LOAD	594.00
HC800-B	261	806-1000	ISOLATOR, HIGH POWER, 60W LOAD	620.00
HC800-C	261	806-1000	ISOLATOR, HIGH POWER, 150W LOAD	753.00
HC800-H	261	806-1000	ISOLATOR, HIGH POWER, 300W LOAD	965.00
HC800-S	261	806-1000	ISOLATOR, H/P, 60W LOAD SENSED	647.00
HD150-0	257	136-174	CIRCULATOR, ONLY HIGH POWER	2599.00
HD150-AA	257	136-174	ISOLATOR, H/P, 30 & 30 WATT	2679.00
HD150-B	257	136-174	ISOLATOR, H/P, 30 & 60 WATT	2705.00
HD150-C	257	136-174	ISOLATOR, H/P, 30 & 150 WATT	2838.00
HD150-H	257	136-174	ISOLATOR, H/P, 30 & 300 WATT	3050.00
HD150-S	257	136-174	ISOLATOR, H/P, 30 & 60 WATT SENSED	2732.00
HD460-0	259	406-512	CIRCULATOR, ONLY HIGH POWER	1379.00
HD460-AA	259	406-512	ISOLATOR, H/P, 30 & 30 WATT LOAD	1459.00
HD460-B	259	406-512	ISOLATOR, H/P, 30 & 60 WATT LOAD	1485.00
HD460-C	259	406-512	ISOLATOR, H/P, 30 & 150 WATT LOAD	1618.00
HD460-H	259	406-512	ISOLATOR, H/P, 30 & 300 WATT LOAD	1830.00
HD460-S	259	406-512	ISOLATOR, H/P, 30 & 60 WATT SENSED	1512.00
HD800-0	261	806-1000	CIRCULATOR, ONLY HIGH POWER	1029.00
HD800-AA	261	806-1000	ISOLATOR, H/P, 30 & 30 WATT LOAD	1109.00
HD800-B	261	806-1000	ISOLATOR, H/P, 30 & 60 WATT LOAD	1135.00
HD800-C	261	806-1000	ISOLATOR, H/P, 30 & 150 WATT LOAD	1268.00
HD800-H	261	806-1000	ISOLATOR, H/P, 30 & 300 WATT LOAD	1480.00
HD800-S	261	806-1000	ISOLATOR, H/P, 30&60 W LOAD SENSED	1162.00
HH070-U	248	66-88	HYBRID, UNIVERSAL MTG. STYLE	434.00
HH150-U	248	136-174	HYBRID, UNIVERSAL MTG. STYLE	434.00
HH460-U	248	406-512	HYBRID, UNIVERSAL MTG. STYLE	434.00
HH800-U	248	806-1000	HYBRID, UNIVERSAL MTG. STYLE	290.00
HL300D	253	25-1000	LOAD TERMINATION (DRY) 300 WATT	451.00
IT600	299		SAMPLER	55.00
MB150	248	150-174	MATCHING NETWORK	108.00

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
MB460	248	406-512	MATCHING NETWORK	108.00
MB900	248	806-1000	MATCHING NETWORK	72.00
N230F	104		RAIL/MAST STAND OFF MOUNT	28.00
N275F	104		HEAVY DUTY MAST MOUNT-ADMIRAL	112.00
N280-F	104		COUPLER, CABLE & PL-259	31.00
N280-N	104		COUPLER, CABLE & TYPE N(M)	31.00
N295F	104		RAIL/MAST MOUNT FOR ADMIRAL	29.00
PBH070	249	66-88	2 CHANNEL COUPLER 60 WATT	743.00
PBH150	249	136-174	2 CHANNEL COUPLER 60 WATT	743.00
PBH460	249	406-512	2 CHANNEL COUPLER 60 WATT	743.00
PBH800	249	806-1000	2 CHANNEL COUPLER 60 WATT	506.00
PCC078-AA	263	66-88	ISOLATION PANEL 30 WATT	631.00
PCC078-B	263	66-88	ISOLATION PANEL 60 WATT	658.00
PCC078-C	263	66-88	ISOLATION PANEL 150 WATT	791.00
PCC078-S	263	66-88	ISOLATION PANEL 60 WATT SENSED	684.00
PCC150-AA	265	136-174	ISOLATION PANEL 30 WATT	631.00
PCC150-B	265	136-174	ISOLATION PANEL 60 WATT	658.00
PCC150-C	265	136-174	ISOLATION PANEL 150 WATT	791.00
PCC150-S	265	136-174	ISOLATION PANEL 60 WATT SENSED	684.00
PCC460-AA	267	406-512	ISOLATION PANEL 30 WATT	594.00
PCC460-B	267	406-512	ISOLATION PANEL 60 WATT	620.00
PCC460-C	267	406-512	ISOLATION PANEL 150 WATT	753.00
PCC460-S	267	406-512	ISOLATION PANEL 60 WATT SENSED	647.00
PCC800-AA	269	806-1000	ISOLATION PANEL 30 WATT	547.00
PCC800-B	269	806-1000	ISOLATION PANEL 60 WATT	573.00
PCC800-C	269	806-1000	ISOLATION PANEL 150 WATT	706.00
PCC800-S	269	806-1000	ISOLATION PANEL 60 WATT SENSED	600.00
PCD078-AA	263	66-88	ISOLATION PANEL 15 & 30 WATT	950.00
PCD078-B	263	66-88	ISOLATION PANEL 15 & 60 WATT	976.00
PCD078-C	263	66-88	ISOLATION PANEL 15 & 150 WATT	1109.00
PCD078-S	263	66-88	ISOLATION PANEL 15 & 60 W SENSED	1003.00
PCD150-AA	265	136-174	ISOLATION PANEL 15 & 30 WATT	950.00
PCD150-B	265	136-174	ISOLATION PANEL 15 & 60 WATT	976.00
PCD150-C	265	136-174	ISOLATION PANEL 15 & 150 WATT	1109.00
PCD150-S	265	136-174	ISOLATION PANEL 15 & 60 W SENSED	1003.00
PCD460-AA	267	406-512	ISOLATION PANEL 15 & 30 WATT	912.00
PCD460-B	267	406-512	ISOLATION PANEL 15 & 60 WATT	938.00
PCD460-C	267	406-512	ISOLATION PANEL 15 & 150 WATT	1071.00
PCD460-S	267	406-512	ISOLATION PANEL 15 & 60 W SENSED	965.00
PCD800-AA	269	806-1000	ISOLATION PANEL 15 & 30 WATT	785.00
PCD800-B	269	806-1000	ISOLATION PANEL 15 & 60 WATT	812.00
PCD800-C	269	806-1000	ISOLATION PANEL 15 & 150 WATT	945.00
PCD800-S	269	806-1000	ISOLATION PANEL 15 & 60 W SENSED	838.00

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PCH070	249	66-88	2 CHANNEL COUPLER 150 WATT	817.00
PCH150	249	136-174	2 CHANNEL COUPLER 150 WATT	817.00
PCH460	249	406-512	2 CHANNEL COUPLER 150 WATT	817.00
PCH800	249	806-1000	2 CHANNEL COUPLER 150 WATT	557.00
PCT078-AA	263	66-88	ISOLATION PANEL 15 & 15 & 30 WATT	1268.00
PCT078-B	263	66-88	ISOLATION PANEL 15 & 15 & 60 WATT	1294.00
PCT078-C	263	66-88	ISOLATION PANEL 15 & 15 & 150 WATT	1427.00
PCT078-S	263	66-88	ISOLATION PANEL 15&15&60 W SENSED	1321.00
PCT150-AA	265	136-174	ISOLATION PANEL 15 & 15 & 30 WATT	1268.00
PCT150-B	265	136-174	ISOLATION PANEL 15 & 15 & 60 WATT	1294.00
PCT150-C	265	136-174	ISOLATION PANEL 15 & 15 & 150 WATT	1427.00
PCT150-S	265	136-174	ISOLATION PANEL 15&15&60 W SENSED	1321.00
PCT460-AA	267	406-512	ISOLATION PANEL 15 & 15 & 30 WATT	1230.00
PCT460-B	267	406-512	ISOLATION PANEL 15 & 15 & 60 WATT	1257.00
PCT460-C	267	406-512	ISOLATION PANEL 15 & 15 & 150 WATT	1389.00
PCT460-S	267	406-512	ISOLATION PANEL 15&15&60 W SENSED	1283.00
PCT800-AA	269	806-1000	ISOLATION PANEL 15 & 15 & 30 WATT	1124.00
PCT800-B	269	806-1000	ISOLATION PANEL 15 & 15 & 60 WATT	1130.00
PCT800-C	269	806-1000	ISOLATION PANEL 15 & 15 & 150 WATT	1263.00
PCT800-S	269	806-1000	ISOLATION PANEL 15&15&60 W SENSED	1157.00
PD10000	62		REFLECTOR ASSY FOR PD458 ANTENNA	136.00
PD10002	136		SIDE MOUNTING (SHORT)	207.00
PD10017	94	800-960*	10 dB OMNIDIR.COLLINEAR CELLULAR	1453.00
PD10017HW	94	806-960*	10 dB OMNIDIR.COLLINEAR HI/WIND	1715.00
PD10022	101	806-960*	UNITY GAIN FIBERGLASS	356.00
PD10024	138		SIDE MOUNTING ASSEMBLY (SHORT)	412.00
PD10028	138		SIDE MOUNTING ASSEMBLY (LONG)	474.00
PD10036	99	928-932	6 dB BASE STATION OMNIDIRECTIONAL	589.00
PD10036DT	99	928-932	5.5 dB BASE STATION DOWNTILT	721.00
PD10037	99	928-932	9 dB BASE STATION OMNIDIRECTIONAL	869.00
PD10037DT	99	928-932	8.5 dB BASE STATION DOWNTILT	984.00
PD10040	109	806-960*	8 dB CORNER REFLECTOR	391.00
PD10041	94	806-960*	7.5 dB BASE STATION OMNIDIRECTION	1327.00
PD10041E	94	824-894	7.5 dB COLLIN FULL BAND HEAVY DUTY	1327.00
PD10054	81	400-512*	7.3 dB PANEL	635.00
PD10055	81	400-512*	10 dB PANEL	917.00
PD10057	167		NYLON CABLE TIES (PKG.50)	57.00
PD10064	135		ADJUSTABLE WALL MTG. HARDWARE	162.00
PD1007	62		REFLECTOR ASSY FOR PD1151	178.00
PD10071	142	806-1000	POWER DIVIDER HARNESS, 2-WAY W/CAB	198.00
PD10072	142	800-960	POWER DIVIDER HARNESS, 2-WAY	124.00
PD10075	142	406-512	POWER DIVIDER HARNESS, 3-WAY	338.00

* ADD DASH # TO MODEL NUMBER FOR FREQ. BANDS

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PD10076	142	800-960	POWER DIVIDER HARNESS, 3-WAY	338.00
PD10077	142	406-512	POWER DIVIDER HARNESS, 4-WAY	338.00
PD10078	142	800-960	POWER DIVIDER HARNESS, 4-WAY	338.00
PD10079	142	406-512	POWER DIVIDER HARNESS, 2-WAY	199.00
PD10085	91	806-960	10 dB 60° SECTOR	674.00
PD10085L	83	824-894	8 dB 60° PANEL W/25°DT "LOCALIZER"	775.00
PD10087	136		UNIVERSAL CROSSOVER CLAMP ASSY	194.00
PD10088-18	166		RG214/U W/N(M) TO N(M) 18"	42.00
PD10088-36	166		RG214/U W/N(M) TO N(M) 36"	55.00
PD10088-72	166		RG214/U W/N(M) TO N(M) 72"	80.00
PD10088-96	166		RG214/U W/N(M) TO N(M) 96"	98.00
PD10089-18	166		RG214/U W/UHF(M) TO N(M) 18"	42.00
PD10089-36	166		RG214/U W/UHF(M) TO N(M) 36"	55.00
PD10089-72	166		RG214/U W/UHF(M) TO N(M) 72"	80.00
PD10089-96	166		RG214/U W/UHF(M) TO N(M) 96"	98.00
PD10090-18	166		RG214/U W/UHF(M) TO UHF(F) 18"	42.00
PD10090-36	166		RG214/U W/UHF(M) TO UHF(F) 36"	55.00
PD10090-72	166		RG214/U W/UHF(M) TO UHF(F) 72"	80.00
PD10090-96	166		RG214/U W/UHF(M) TO UHF(F) 96"	98.00
PD10091-36	166		LLFLEX 12 N(M) TO N(M) 36"	130.00
PD10091-72	166		LLFLEX 12 N(M) TO N(M) 72"	141.00
PD10091-96	166		LLFLEX 12 N(M) TO N(M) 96"	149.00
PD10099	91	806-960	13 dB 60° SECTOR	1461.00
PD10108	111	806-960*	10 dB SINGLE YAGI	236.00
PD10108D	111	806-960*	13 dB DUAL YAGI	560.00
PD10116	139		SIDE MT.ASSY./PD200 (3"-4")	754.00
PD10117	139		SIDE MT.ASSY./PD200 (4"-6")	884.00
PD10118	139		SIDE MT.ASSY./PD200 (3"-4")	652.00
PD10119	139		SIDE MT.ASSY./PD200 (4"-6")	543.00
PD10120	139		SIDE MT.ASSY./PD220,455 (3"-4")	652.00
PD10121	139		SIDE MT.ASSY./PD220,455 (3"-4")	754.00
PD10122	139		SIDE MT.ASSY./PD220,455 (4"-6")	543.00
PD10123	139		SIDE MT.ASSY./PD220,455 (4"-6")	884.00
PD10124	139		SIDE MT.ASSY./PD620,755 (3"-4")	754.00
PD10125	139		SIDE MT.ASSY./PD620,755 (4"-6")	884.00
PD10126	139		SIDE MT.ASSY./PD201,399 (3"-4")	754.00
PD10127	139		SIDE MT.ASSY./PD201,399 (4"-6")	882.00
PD10128	139		SIDE MT.ASSY./PD201,399 (3"-4")	652.00
PD10129	139		SIDE MT.ASSY./PD201,399 (4"-6")	541.00
PD10136	139		SIDE MT.ASSY./PD458,CELL. (3"-4")	488.00
PD10137	139		SIDE MT.ASSY./PD458,CELL. (4"-6")	560.00
PD10138	139		SIDE MT.ASSY./PD458,CELL. (3"-4")	815.00

* ADD DASH # TO MODEL NUMBER FOR FREQ. BANDS

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PD10139	139		SIDE MT.ASSY./PD458,CELL. (4"-6")	939.00
PD10140	139		SIDE MT.ASSY./PD79,83 (4"-6")	552.00
PD10141	139		SIDE MT.ASSY./PD79,83 (4"-6")	541.00
PD10142	139		SIDE MT.ASSY./PD79,83 (3"-4")	754.00
PD10143	139		SIDE MT.ASSY./PD79,83 (4"-6")	884.00
PD10144	139		SIDE MT.ASSY./PD400,10037, (3"-4")	552.00
PD10145	139		SIDE MT.ASSY./PD400,10037, (4"-6")	543.00
PD10146	139		SIDE MT.ASSY./PD400,10037, (3"-4")	754.00
PD10147	139		SIDE MT.ASSY./PD400,10037, (4"-6")	884.00
PD10148	139		SIDE MT.ASSY./PD1150 (3"-4")	552.00
PD10149	139		SIDE MT.ASSY./PD1150 (4"-6")	543.00
PD10150	139		SIDE MT.ASSY./PD1150 (3"-4")	754.00
PD10151	139		SIDE MT.ASSY./PD1150 (4"-6")	884.00
PD10152	139		SIDE MT.ASSY./PD1151 (3"-4")	552.00
PD10153	139		SIDE MT.ASSY./PD1151 (4"-6")	543.00
PD10154	139		SIDE MT.ASSY./PD1151 (3"-4")	754.00
PD10155	139		SIDE MT.ASSY./PD1151 (4"-6")	884.00
PD10162	97	824-894*	1/4W SINGLE REFLECTOR FOR PD1110	1839.00
PD10163	97	824-894*	1/2W SINGLE REFLECTOR FOR PD1110	1839.00
PD10164	97	824-894*	1/4W SINGLE REFLECTOR FOR PD10017	1993.00
PD10165	97	824-894*	1/2W SINGLE REFLECTOR FOR PD10017	1993.00
PD10166	97	824-894*	1/4W SINGLE REFLECTOR FOR PD1109E	1686.00
PD10168	97	824-894*	1/4W DUAL REFLECTOR FOR PD1110	1907.00
PD10170	97	824-894*	1/4W DUAL REFLECTOR FOR PD10017	2059.00
PD10172	97	824-894*	1/4W DUAL REFLECTOR FOR PD1109E	1753.00
PD10175	85	806-960	16 dB 60° PANEL, AMPS & TACS	3596.00
PD10175H	85	806-960	16 dB 60° PANEL,AMPS & TACS W/PIPE	3652.00
PD10176-3	107	800-900	9 dB 105° PANEL, AMPS W/O HARDWARE	964.00
PD10176-4	107	800-900	9 dB 105° PANEL, AMPS W/HARDWARE	1013.00
PD10177	85	824-894	16 dB 60° PANEL, AMPS	1900.00
PD10177H	85	824-894	16 dB 60° PANEL, AMPS W/PIPE	1950.00
PD10178	85	890-960	16 dB 60° PANEL, TACS	1900.00
PD10178H	85	890-960	16 dB 60° PANEL, TACS W/PIPE	1950.00
PD10180	138		TILT MOUNT KIT	661.00
PD10183	NL	806-960*	10 dB BROADBAND, OMNIDIRECTIONAL	1792.00
PD10186	91	806-960	7 dB 60° SECTOR	525.00
PD10188	87	820-960	10.5 dB 120° PANEL	980.00
PD10189	87	820-960	13.5 dB 120° PANEL	1484.00
PD10191	65	279-281	UNITY COLLINEAR	297.00
PD10193	NL	820-900	12.2 dB GAIN, 37 DEGREE SECTOR	1622.00
PD10194	NL	820-900	15.2 dB GAIN, 37 DEGREE SECTOR	2756.00
PD10197	89	824-894	11.5 dB WIDEBAND 90° SECTOR ANT	980.00

* ADD DASH # TO MODEL NUMBER FOR FREQ. BANDS

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PD10200	89	824-894	14.5 dB WIDEBAND 90° SECTOR ANT	1484.00
PD10201	107	800-900	12 dB 105° AMPS ANTENNA	2528.00
PD10204	65	279-281	3 dB COLLINEAR	511.00
PD10206	138		ADAPTER PLATE KIT FOR PD10180	414.00
PD10207	20	824-896	AM/FM 3 dB CELLULAR ADVANTAGE	350.00
PD10210-M	18	824-896	3 dB ELEVATED ADVANTAGE, MINI UHF	76.00
PD10210-T	18	824-896	3 dB ELEVATED ADVANTAGE, TNC	76.00
PD10213	NL	824-894	6.0 dB GAIN, 80 DEGREE SECTOR	560.00
PD10214	NL	824-894	9.0 dB GAIN, 80 DEGREE SECTOR	680.00
PD10215	NL	824-894	12.0 dB GAIN, 80 DEGREE SECTOR	1360.00
PD10216	NL	806-960	4.5 dB GAIN, 120 DEGREE SECTOR	500.00
PD10217	NL	806-960	7.5 dB GAIN, 120 DEGREE SECTOR	600.00
PD10219	NL	890-960	17 dB, 62 DEGREE WIDEBAND SECTOR	3600.00
PD10228	NL		DOWNTILT KIT	125.00
PD10236	NL	820-900	11.0 dB GAIN, 100 DEGREE SECTOR	660.00
PD10237	NL	820-900	10.75 dB GAIN, 105 DEGREE SECTOR	660.00
PD10238	NL		MOUNTING BRACKET	75.00
PD10238R	NL		MOUNTING BRACKET WITH RETROFIT KIT	95.00
PD10239	NL	824-894	8.5 dB GAIN, 45 DEGREE SECTOR	800.00
PD1048	NL	132-174	PD328 W/PD376 SIDE MOUNT	142.00
PD1061	12	148-174	LOW PROFILE RADOME, SUPER HD	146.00
PD1062	NL	406-512	LOW PROFILE RADOME, SUPER HD	94.00
PD1073	12	406-512	LOW PROFILE RADOME, SUPER HD	108.00
PD1080	NL		SPRING FOR PD1035 SERIES	20.00
PD1107	53	150-174*	3 dB FIBERGLASS	382.00
PD1108	94	806-960*	5 dB COLLINEAR OMNIDIRECTIONAL	1042.00
PD1109	94	806-960*	7.5 dB COLLINEAR OMNIDIRECTIONAL	1097.00
PD1109E	94	824-894	7.5 dB COLLINEAR OMNI, FULL BAND	1097.00
PD1110	94	806-960*	9 dB COLLINEAR OMNIDIRECTIONAL	1285.00
PD1110HW	94	806-952*	9 dB COLLINEAR OMNIDIR. HI/WIND	1531.00
PD1121	55	144-178*	3 dB BROADBAND DIPOLE	109.00
PD1124	109	806-960*	9 dB CORNER REFLECTOR	372.00
PD1132R	105	806-960*	16 dB UNIDIRECTIONAL COLLINEAR	2262.00
PD1132RD	105	806-960*	16 dB DUAL DIRECTIONAL	4465.00
PD1136	NL	806-960*	10.5 dB UNIDIRECTIONAL COLLIN.	1981.00
PD114-1	33	25-30	UNITY COAXIAL LIGHTWEIGHT	388.00
PD114-2	33	30-36	UNITY COAXIAL LIGHTWEIGHT	388.00
PD114-3	33	36.25-42	UNITY COAXIAL LIGHTWEIGHT	388.00
PD114-4	33	42.25-48	UNITY COAXIAL LIGHTWEIGHT	388.00
PD114-5	33	48.25-50	UNITY COAXIAL LIGHTWEIGHT	388.00
PD114-6	33	144-174	UNITY COAXIAL LIGHTWEIGHT	300.00
PD114-7	33	66-88	UNITY COAXIAL LIGHTWEIGHT	353.00

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PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PD1142-1	35	25-30	UNITY GAIN FIBERGLASS	489.00
PD1142-2A	35	30-35	UNITY GAIN FIBERGLASS	449.00
PD1142-2B	35	35-42	UNITY GAIN FIBERGLASS	449.00
PD1142-2C	35	42-54	UNITY GAIN FIBERGLASS	449.00
PD1142-3	35	66-88	UNITY GAIN FIBERGLASS	412.00
PD1147	183	136-174	NOTCH CAVITY	368.00
PD1148	183	406-512	NOTCH CAVITY	308.00
PD114A-1	33	25-30	UNITY COAXIAL LIGHTWEIGHT SS	454.00
PD114A-2	33	30-36	UNITY COAXIAL LIGHTWEIGHT SS	454.00
PD114A-3	33	36.25-42	UNITY COAXIAL LIGHTWEIGHT SS	454.00
PD114A-4	33	42.25-48	UNITY COAXIAL LIGHTWEIGHT SS	454.00
PD114A-5	33	48.25-50	UNITY COAXIAL LIGHTWEIGHT SS	454.00
PD114A-6	33	144-174	UNITY COAXIAL LIGHTWEIGHT SS	359.00
PD114A-7	33	66-88	UNITY COAXIAL LIGHTWEIGHT SS	419.00
PD1150	71	406-512*	5 dB SUPER STATIONMASTER	530.00
PD1151	73	406-512*	8 dB SUPER STATIONMASTER	768.00
PD1153	183	406-512	NOTCH CAVITY	368.00
PD1155	181	406-512	PASS REJECT CAVITY	358.00
PD1157	191	406-512	DUAL NOTCH DUPLEXER	2318.00
PD1158D	41	150-174	12 dB DUAL YAGI	839.00
PD1158S	39	150-174	9 dB SINGLE YAGI	339.00
PD1167	47	144-174	3 dB OMNIDIRECTIONAL FIBERGLASS	511.00
PD1185	175	66-88	BAND PASS CAVITY	1159.00
PD1186	175	136-174	BAND PASS CAVITY	1136.00
PD1187	175	406-512	BAND PASS CAVITY	1136.00
PD1189-18	166		RG393/U W/N(M) TO N(M) 18"	62.00
PD1189-36	166		RG393/U W/N(M) TO N(M) 36"	75.00
PD1189-72	166		RG393/U W/N(M) TO N(M) 72"	94.00
PD1189-96	166		RG393/U W/N(M) TO N(M) 96"	106.00
PD1190-18	166		RG393/U W/UHF(M) TO UHF(F) 18"	69.00
PD1190-36	166		RG393/U W/UHF(M) TO UHF(F) 36"	79.00
PD1190-72	166		RG393/U W/UHF(M) TO UHF(F) 72"	99.00
PD1190-96	166		RG393/U W/UHF(M) TO UHF(F) 96"	110.00
PD1191-18	166		RG393/U W/UHF(M) TO N(M) 18"	63.00
PD1191-36	166		RG393/U W/UHF(M) TO N(M) 36"	76.00
PD1191-72	166		RG393/U W/UHF(M) TO N(M) 72"	95.00
PD1191-96	166		RG393/U W/UHF(M) TO N(M) 96"	107.00
PD1255	136		CLAMP SET & BRACKET	57.00
PD1256	164		CONN. ATTACH OPTION 1-5/8" + 3"	18.00
PD1259	NL		CONN. ATTACH OPTION - AIR CABLE	50.00
PD128-1	28	25-29	UNITY MONOPOLE GENERAL SERVICE	430.00
PD128-1FT	28	25-29	UNITY MONOPOLE GENERAL SERVICE	430.00

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PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PD128-2	28	30-39.5	UNITY MONOPOLE GENERAL SERVICE	430.00
PD128-2A	28	39.75-54	UNITY MONOPOLE GENERAL SERVICE	430.00
PD128-2FT	28	30-54	UNITY MONOPOLE GENERAL SERVICE	430.00
PD128-3	28	66-88	UNITY MONOPOLE GENERAL SERVICE	386.00
PD128-3FT	28	66-88	UNITY MONOPOLE GENERAL SERVICE	386.00
PD128-4	28	108-176	UNITY MONOPOLE GENERAL SERVICE	259.00
PD128-4FT	28	108-176	UNITY MONOPOLE GENERAL SERVICE	259.00
PD128-5	28	406-512	UNITY MONOPOLE GENERAL SERVICE	241.00
PD128-5FT	28	406-512	UNITY MONOPOLE GENERAL SERVICE	241.00
PD128-6	63	279-281	UNITY MONOPOLE GENERAL SERVICE	259.00
PD151	167		ROTARY CABLE CUTTER	93.00
PD152-4	43	108-174	UNITY GROUND PLANE	342.00
PD152-5	43	406-512	UNITY GROUND PLANE	342.00
PD156D-3	41	66-88	9.3 dB DUAL YAGI	1323.00
PD156D-4	41	144-174	9.3 dB DUAL YAGI	545.00
PD156S-3	39	66-88	7 dB SINGLE YAGI	712.00
PD156S-4	39	150-174	7 dB SINGLE YAGI	272.00
PD156S-5	63	279-281	7 dB SINGLE YAGI	272.00
PD16-5	104		FOUR WAY SWIVEL MOUNT	122.00
PD1600	251	150-174	LOW PASS HARMONIC FILTER	391.00
PD1601	251	450-512	LOW PASS HARMONIC FILTER	355.00
PD1610	101	806-960*	3 dB COLLINEAR OMNIDIRECTIONAL	371.00
PD176-514C	168		CABLE STRAP - 1/2"	2.00
PD176-516C	168		CABLE STRAP - 7/8"	2.00
PD19-5	104		10' EXTENSION MAST	140.00
PD20-5	104		5' EXTENSION MAST	106.00
PD200	51	120-174	5.8 dB STATIONMASTER	658.00
PD201	71	406-512*	5 dB STATIONMASTER	444.00
PD206-1	28	25-30	3 dB MONOPOLE CARDIOID	614.00
PD206-2	28	31-40	3 dB MONOPOLE CARDIOID	591.00
PD206-2A	28	41-54	3 dB MONOPOLE CARDIOID	591.00
PD206-3	28	66-88	3 dB MONOPOLE CARDIOID	584.00
PD207	63	279-281	3 dB MONOPOLE CARDIOID	396.00
PD207	28	150-174	3 dB MONOPOLE CARDIOID	396.00
PD220	49	136-225*	5.25 dB SUPER STATIONMASTER	709.00
PD220DT	49	136-174	5 dB SUPER STATIONMASTER	868.00
PD237	136		UNIVERSAL CROSSOVER PLATE	33.00
PD24-5	104		FOUR WAY RATCHET MOUNT SS	114.00
PD241	135		UNIVERSAL CLAMP SET	41.00
PD246	135		UNIVERSAL CLAMP SET	60.00
PD255	167		WEATHERPROOF HOUSING (PKG.10)	25.00
PD275	167		POLYKEN TAPE (PKG.10)	27.00

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PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PD278	142	25-400	POWER DIVIDER HARNESS, 2-WAY	96.00
PD279	142	25-400	POWER DIVIDER HARNESS, 4-WAY	268.00
PD295-25	167		STRAPTITE-25'	23.00
PD302	137		SIDE MOUNTING ASSEMBLY (SHORT)	317.00
PD303	137		SIDE MOUNTING ASSEMBLY (LONG)	436.00
PD315-2	37	30-54	3 dB OMNIDIRECTIONAL COLLINEAR	1984.00
PD315-3	37	66-88	3 dB OMNIDIRECTIONAL COLLINEAR	1764.00
PD320-1	31	30-39	2.5 dB SIDE MOUNT SINGLE BAY	357.00
PD320-2	31	40-54	2.5 dB SIDE MOUNT SINGLE BAY	346.00
PD320-3	31	66-88	2.5 dB SIDE MOUNT SINGLE BAY	320.00
PD322-1	31	30-39	2.5 -5 dB SIDE MOUNT TWO BAY	805.00
PD322-2	31	40-54	2.5 -5 dB SIDE MOUNT TWO BAY	703.00
PD322-3	31	66-88	2.5 -5 dB SIDE MOUNT TWO BAY	646.00
PD324-1	31	30-39	5 -7.5 dB SIDE MOUNT FOUR BAY	1665.00
PD324-2	31	40-54	5 -7.5 dB SIDE MOUNT FOUR BAY	1646.00
PD324-3	31	66-88	5 -7.5 dB SIDE MOUNT FOUR BAY	1441.00
PD33-5	104		UPPER SUPPORT WITH SNAP IN ADJ	37.00
PD340	59	140-174*	6 dB BROADBAND DIPOLE ARRAY	673.00
PD340LSP	59	140-174*	PD340 (LESS SUPPORT PIPE)	540.00
PD340TP	59	140-174*	PD340 (TWO PIECE)	766.00
PD344	55	148-174	4.5 dB DIPOLE WITH DIRECTOR	243.00
PD345	59	150-174*	3 dB BROADBAND DUAL ARRAY	759.00
PD345LSP	59	150-174*	PD345 (LESS SUPPORT PIPE)	686.00
PD345TP	59	150-174*	PD345 (TWO PIECE)	815.00
PD346	135		HEAVY DUTY CLAMP SET	131.00
PD370-18	166		RG8A/U W/UHF(M) TO UHF(F) 18"	35.00
PD370-36	166		RG8A/U W/UHF(M) TO UHF(F) 36"	40.00
PD370-72	166		RG8A/U W/UHF(M) TO UHF(F) 72"	43.00
PD370-96	166		RG8A/U W/UHF(M) TO UHF(F) 96"	45.00
PD371-18	166		RG8A/U W/N(M) TO N(M) 18"	33.00
PD371-36	166		RG8A/U W/N(M) TO N(M) 36"	35.00
PD371-72	166		RG8A/U W/N(M) TO N(M) 72"	40.00
PD371-96	166		RG8A/U W/N(M) TO N(M) 96"	42.00
PD374-18	166		RG8A/U W/UHF(M) TO N(M) 18"	31.00
PD374-36	166		RG8A/U W/UHF(M) TO N(M) 36"	35.00
PD374-72	166		RG8A/U W/UHF(M) TO N(M) 72"	40.00
PD374-96	166		RG8A/U W/UHF(M) TO N(M) 96"	42.00
PD390D	41	144-225*	11 dB DUAL YAGI	673.00
PD390S	39	144-225*	8 dB SINGLE YAGI	295.00
PD395	167		LIGHTNING ARRESTER TYPE N FEMALE	50.00
PD400	73	406-512*	7.5 dB STATIONMASTER	615.00
PD402	137		SIDE MOUNTING ASSEMBLY (SHORT)	232.00

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MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PD403	137		SIDE MOUNTING ASSEMBLY (LONG)	294.00
PD440	59	140-174*	3 dB BROADBAND DIPOLE ARRAY	391.00
PD440LSP	59	140-174*	PD440 (LESS SUPPORT PIPE)	347.00
PD453	43	108-174*	UNITY BROADBAND GROUND PLANE	361.00
PD455	77	406-512*	10 dB SUPER STATIONMASTER	948.00
PD455DT	77	406-512	9.5 dB SUPER STATIONMASTER	1084.00
PD458	75	406-512*	8 dB BROADBAND STORM CHIEF	1098.00
PD458K	75	406-512*	8 dB BROADBAND HI/PWR STORM CHIEF	1412.00
PD46	135		UNIVERSAL CLAMP SET	42.00
PD46A	135		CLAMP SET	33.00
PD477	167		CABLE GROUNDING CLAMP (PKG.3)	34.00
PD497-0	191	66-88	DUAL NOTCH DUPLEXER	3005.00
PD497-1	191	136-174	DUAL NOTCH DUPLEXER	2269.00
PD500-0	179	66-88	BAND PASS CAVITY	474.00
PD500-0S	179	88-118	BAND PASS CAVITY	466.00
PD500-1S	179	118-136	BAND PASS CAVITY	341.00
PD500-2	179	200-300	BAND PASS CAVITY	322.00
PD500-3	179	300-406	BAND PASS CAVITY	304.00
PD500-4	179	406-512	BAND PASS CAVITY	295.00
PD500-8	179	806-960	BAND PASS CAVITY	279.00
PD5013-A	177	440-512	8" UHF BAND PASS CAVITY	653.00
PD5013-B	177	148-174	8" VHF BAND PASS CAVITY	653.00
PD5013-E	177	275-300	8" BAND PASS CAVITY	653.00
PD502	136		SIDE MOUNTING ASSEMBLY (SHORT)	222.00
PD503	137		SIDE MOUNTING ASSEMBLY (LONG)	419.00
PD504	136		SIDE MOUNTING ASSEMBLY (LONG)	286.00
PD5042	195	138-225*	DUAL NOTCH DUPLEXER	3300.00
PD5043-8	207	806-960	BAND PASS DUPLEXER	2424.00
PD5044-4	219	406-512	BAND PASS FILTER	1314.00
PD5044-8	219	806-960	BAND PASS FILTER	1210.00
PD5046	NL	890-960	DUAL NOTCH BASESTATION DUPLEXER	1294.00
PD505-0	181	66-88	PASS REJECT CAVITY	532.00
PD505-4	181	406-512	PASS REJECT CAVITY	289.00
PD506-0	189	66-88	DUAL NOTCH DUPLEXER	2050.00
PD506-1	189	136-174	DUAL NOTCH DUPLEXER	1639.00
PD506-2	189	220-225	DUAL NOTCH DUPLEXER	1572.00
PD506230	242		POWER SUPPLY (120 VAC)	259.00
PD506260	242		POWER SUPPLY (240 VAC)	259.00
PD506270	242		POWER SUPPLY (28 VDC)	259.00
PD506290	242		POWER SUPPLY (120VAC/28VDC)	312.00
PD5078	196	896-960	TELEMETRY DUPLEXER 6 CAVITY	315.00
PD5079	196	896-960	TELEMETRY DUPLEXER 4 CAVITY	236.00

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MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PD508000	299		CABLE SET FOR CABINET	84.00
PD5085	193	138-174*	COMPACT DUPLEXER	786.00
PD5090	179	136-174*	BAND PASS CAVITY	332.00
PD5091	181	136-174*	PASS NOTCH CAVITY	349.00
PD5094-14BA	215	835-849	Rx FILTER	836.00
PD5102-6-4NF	221	450-470	COMBLINE RECEIVE FILTER	583.00
PD5102-6-4NFD	221	450-470	DUAL COMBLINE RECEIVE FILTER	1220.00
PD5122-10	210	890-960	COMBLINE FILTER	1029.00
PD5134-10	210	806-866	COMBLINE FILTER	1264.00
PD5134-10T	210	851-866	COMBLINE FILTER	610.00
PD5134-18	210	806-869	COMBLINE FILTER	1264.00
PD5182-1	218	896-902	COMBLINE BANDPASS FILTER	1059.00
PD5185-2	216	835-849	E AMPS FILTER, WIRELINE	3395.00
PD5188-14	209	824-894	DUPLEXER, WIRELINE	1273.00
PD5188-25	209	824-894	DUPLEXER, NON-WIRELINE	1326.00
PD5192-14L	211	880-894	Tx FILTER, WIRELINE	1114.00
PD5192-14N	211	880-894	Tx FILTER, WIRELINE	1046.00
PD5192-25L	211	869-894	Tx FILTER, NON-WIRELINE	1114.00
PD5192-25N	211	869-894	Tx FILTER, NON-WIRELINE	1046.00
PD5195-1	216	824-846.5	E AMPS FILTER, NON-WIRELINE	3395.00
PD5198	217	835-849	BAND PASS FILTER	811.00
PD5200	233/235		RMC DISTRIBUTION TRAY	690.00
PD526	205	406-512*	DUAL NOTCH DUPLEXER	1217.00
PD526-SR	205	406-512*	DUAL NOTCH DUPLEXER REVERSE MT	1217.00
PD54-5	104		DECK MOUNT FOR ADMIRAL SERIES	79.00
PD543000	299		SYSTEM CABINET 70"x 22"x 22"	1273.00
PD543050	299		SYSTEM CABINET 78"x 22"x 22"	1630.00
PD543740	299		OPEN RACK 73-3/8"x 20-7/8"x 26"	548.00
PD543860	299		OPEN RACK 64-5/8"x 20-7/8"x 26"	424.00
PD555	62		REFLECTOR ASSY FOR PD220	183.00
PD556	137		SIDE MOUNTING ASSEMBLY (SHORT)	291.00
PD561	138		SIDE MOUNT ASSY FOR PD620,PD755	560.00
PD568	62		REFLECTOR ASSY FOR PD455,PD400	163.00
PD593	167		LIGHTNING ARRESTOR UHF(F)	29.00
PD620	49	136-174*	5.25 dB SUPER STATIONMASTER H.DUTY	1622.00
PD620DT	49	136-174	5 dB SUPER STATIONMASTER H.DUTY	1867.00
PD633-6A	203	355-512*	UHF MOBILE DUPLEXER, 6 CAVITY	326.00
PD633-A	203	406-512*	UHF MOBILE DUPLEXER, 4 CAVITY	249.00
PD636-6A	199	144-174*	VHF MOBILE DUPLEXER, 6 CAVITY	362.00
PD636-A	199	144-174*	VHF MOBILE DUPLEXER, 4 CAVITY	256.00
PD638	193	406-470	COMPACT BASE STATION DUPLEXER	432.00
PD638-6-0	193	66-88	COMPACT BASE STATION DUPLEXER	898.00

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PD638-6-1	193	150-174	COMPACT BASE STATION DUPLEXER	898.00
PD638-6-2	193	220-225	COMPACT BASE STATION DUPLEXER	823.00
PD638-6-4	193	406-470	COMPACT BASE STATION DUPLEXER	769.00
PD638-6-5	193	470-512	COMPACT BASE STATION DUPLEXER	823.00
PD640000	242	146-174	SINGLE STAGE 150MHZ AMPLIFIER	829.00
PD640060	242	806-960	SINGLE STAGE 800MHZ AMPLIFIER	621.00
PD640080	242	806-960	DUAL STAGE 800MHZ AMPLIFIER	1358.00
PD640240	242	806-960	SINGLE STAGE 800MHZ AMPLIFIER	969.00
PD640290	242	806-920	DUAL AMPLIFIER WITH HYBRID	1442.00
PD644	175	30-39	BAND PASS CAVITY	1248.00
PD645	175	39-50	BAND PASS CAVITY	1123.00
PD654	57	140-174*	9 dB BROADBAND DIPOLE ARRAY	2048.00
PD654-FP	57	150-174*	PD654 (FOUR PIECE)	2392.00
PD656130	242	66-88	AMPLIFIER AND WIRE ASSY	974.00
PD656140	242	406-512	AMPLIFIER AND WIRE ASSY	871.00
PD656210	242	806-1000	4-PORT RMC EXPANSION KIT	217.00
PD656220	242	806-1000	8-PORT RMC EXPANSION KIT	435.00
PD656230	296	806-1000	3/4 WAVE TJD EXP.KIT. 1 CHANNEL	1241.00
PD656250	296	806-1000	3/4 WAVE TJD EXP.KIT. 1 CHANNEL	1109.00
PD656270	242	806-1000	RMC DIVIDER BRACKET KIT	34.00
PD656520	242	20-512	4 WAY DIVIDER W/CABLE	239.00
PD656650	242	20-512	8 WAY DIVIDER W/CABLE	477.00
PD656940	296	851-866	EXPANSION KIT FOR SJ	133.00
PD671	62		REFLECTOR ASSY FOR PD201	89.00
PD688D	79	406-512*	13 dB DUAL YAGI	586.00
PD688S	79	406-512*	10 dB SINGLE YAGI	252.00
PD695	181	406-512	PASS REJECT CAVITY	235.00
PD696	206	406-512*	DUAL NOTCH DUPLEXER	940.00
PD696-SR	206	406-512*	DUAL NOTCH DUPLEXER REVERSE MT	940.00
PD7340	197	144-160	MINIPLEXER DUPLEXER, 4 CAVITY	299.00
PD7360	197	144-160	MINIPLEXER DUPLEXER, 6 CAVITY	395.00
PD7440	197	155-174	MINIPLEXER DUPLEXER, 4 CAVITY	299.00
PD7460	197	155-174	MINIPLEXER DUPLEXER, 6 CAVITY	395.00
PD7540	201	406-440	MINIPLEXER DUPLEXER, 4 CAVITY	269.00
PD755	77	406-512*	10 dB SUPER STATIONMASTER	1786.00
PD755DT	77	406-512	9.5 dB SUPER STATIONMASTER	1912.00
PD7560	201	406-440	MINIPLEXER DUPLEXER, 6 CAVITY	351.00
PD7640	201	430-470	MINIPLEXER DUPLEXER, 4 CAVITY	269.00
PD7660	201	430-470	MINIPLEXER DUPLEXER, 6 CAVITY	351.00
PD821-M	19	806-896	3 dB GLASS ADVANTAGE MINI UHF	62.00
PD821-M/25	NL	806-896	3 dB GLASS ADVANTAGE MINI UHF 25/P	1550.00
PD821-T	19	806-896	3 dB GLASS ADVANTAGE TNC	62.00

* ADD DASH # TO MODEL NUMBER FOR FREQ. BANDS

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PD821-T/25	NL	806-896	3 dB GLASS ADVANTAGE TNC 25/PER	1550.00
PD83-1	33	25-29.75	UNITY COAXIAL GENERAL SERVICE	563.00
PD83-2	33	30-39.75	UNITY COAXIAL GENERAL SERVICE	485.00
PD83-3	33	40-50	UNITY COAXIAL GENERAL SERVICE	469.00
PD83-4	33	70-76	UNITY COAXIAL GENERAL SERVICE	401.00
PD83-5	33	144-175	UNITY COAXIAL GENERAL SERVICE	346.00
PD83A-1	33	25-29.75	UNITY COAXIAL GENERAL SERVICE SS	606.00
PD83A-2	33	30-39.75	UNITY COAXIAL GENERAL SERVICE SS	540.00
PD83A-3	33	40-50	UNITY COAXIAL GENERAL SERVICE SS	524.00
PD83A-4	33	70-76	UNITY COAXIAL GENERAL SERVICE SS	457.00
PD83A-5	33	144-175	UNITY COAXIAL GENERAL SERVICE SS	401.00
PD89	135		UNIVERSAL CLAMP SET	23.00
PD895	181	806-960	PASS REJECT CAVITY	204.00
PD896	206	806-960	DUAL NOTCH DUPLEXER	1089.00
PD896-SR	206	806-960	DUAL NOTCH DUPLEXER REVERSE MT	1089.00
PD900-M	19	870-960	3 dB GLASS ADVANTAGE MINI UHF	62.00
PD900-M/25	NL	870-960	3 dB GLASS ADVANTAGE MINI UHF 25/P	1550.00
PD900-T	19	870-960	3 dB GLASS ADVANTAGE TNC	62.00
PD900-T/25	NL	870-960	3 dB GLASS ADVANTAGE TNC 25/PER	1550.00
PD90018	138		INS. ADJ. UPPER SUPPORT (SHORT)	153.00
PD90019	138		INS. ADJ. UPPER SUPPORT (LONG)	165.00
PD901-PB4	223	66-88*	COMPACT PRESELECTOR	250.00
PD911-PB4	223	144-174*	COMPACT PRESELECTOR	231.00
PD941-PB4	223	406-474*	COMPACT PRESELECTOR	217.00
PD951-PB4	223	474-512*	COMPACT PRESELECTOR	217.00
PHC070-B	263	66-88	ISOLATION PANEL 60 WATT	1591.00
PHC070-C	263	66-88	ISOLATION PANEL 150 WATT	1724.00
PHC070-H	263	66-88	ISOLATION PANEL 300 WATT	1936.00
PHC070-S	263	66-88	ISOLATION PANEL 60 WATT SENSED	1618.00
PHC150-B	265	136-174	ISOLATION PANEL 60 WATT	1618.00
PHC150-C	265	136-174	ISOLATION PANEL 150 WATT	1750.00
PHC150-H	265	136-174	ISOLATION PANEL 300 WATT	1962.00
PHC150-S	265	136-174	ISOLATION PANEL 60 WATT SENSED	1644.00
PHC460-B	267	406-512	ISOLATION PANEL 60 WATT	1008.00
PHC460-C	267	406-512	ISOLATION PANEL 150 WATT	1140.00
PHC460-H	267	406-512	ISOLATION PANEL 300 WATT	1353.00
PHC460-S	267	406-512	ISOLATION PANEL 60 WATT SENSED	1034.00
PHC800-H	269	806-1000	ISOLATION PANEL 300 WATT	1177.00
PHD150-B	265	136-174	ISOLATION PANEL 30 & 60 WATT	2917.00
PHD150-C	265	136-174	ISOLATION PANEL 30 & 150 WATT	3050.00
PHD150-H	265	136-174	ISOLATION PANEL 30 & 300 WATT	3262.00
PHD150-S	265	136-174	ISOLATION PANEL 30 & 60 W SENSED	2944.00

* ADD DASH # TO MODEL NUMBER FOR FREQ. BANDS

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
PHD460-B	267	406-512	ISOLATION PANEL 30 & 60 WATT	1697.00
PHD460-C	267	406-512	ISOLATION PANEL 30 & 150 WATT	1830.00
PHD460-H	267	406-512	ISOLATION PANEL 30 & 300 WATT	2042.00
PHD460-S	267	406-512	ISOLATION PANEL 30 & 60 W SENSED	1724.00
PHD800-B	269	806-1000	ISOLATION PANEL 30 & 60 WATT	1347.00
PHD800-C	269	806-1000	ISOLATION PANEL 30 & 150 WATT	1480.00
PHD800-H	269	806-1000	ISOLATION PANEL 30 & 300 WATT	1692.00
PHH150	249	136-174	2 CHANNEL COUPLER 300 WATT	1056.00
PHH460	249	406-512	2 CHANNEL COUPLER 300 WATT	1056.00
PHH800	249	800-1000	2 CHANNEL COUPLER 300 WATT	854.00
PL-258	166		TEFLON INS. UHF FEMALE	7.00
PL-259T	166		TEFLON INS. UHF MALE	7.00
RG-214/U	165		COAXIAL CABLE, DOUBLE SHIELDED	5.00
RG-8A/U	165		COAXIAL CABLE	1.00
RG393/U	165		COAXIAL CABLE, TEFLON DIELECTRIC	17.00
RMC070-12	230	66-88	MULTICOUPLER, 12 CHANNELS	2232.00
RMC070-16	230	66-88	MULTICOUPLER, 16 CHANNELS	2466.00
RMC070-4	230	66-88	MULTICOUPLER, 4 CHANNELS	1659.00
RMC070-8	230	66-88	MULTICOUPLER, 8 CHANNELS	2027.00
RMC150-12	230	136-174	MULTICOUPLER, 12 CHANNELS	2139.00
RMC150-16	230	136-174	MULTICOUPLER, 16 CHANNELS	2402.00
RMC150-4	230	136-174	MULTICOUPLER, 4 CHANNELS	1659.00
RMC150-8	230	136-174	MULTICOUPLER, 8 CHANNELS	1914.00
RMC460-12	230	406-512	MULTICOUPLER, 12 CHANNELS	2151.00
RMC460-16	230	406-512	MULTICOUPLER, 16 CHANNELS	2415.00
RMC460-4	230	406-512	MULTICOUPLER, 4 CHANNELS	1673.00
RMC460-8	230	406-512	MULTICOUPLER, 8 CHANNELS	1937.00
RMC800-12	239	806-824	MULTICOUPLER, 12 CHANNELS	3117.00
RMC800-12A	237	806-824	MULTICOUPLER, 12 CHANNELS	3986.00
RMC800-12K	237	806-824	MULTICOUPLER, 12 CHANNELS	5178.00
RMC800-16	239	806-824	MULTICOUPLER, 16 CHANNELS	3399.00
RMC800-20	239	806-824	MULTICOUPLER, 20 CHANNELS	3824.00
RMC800-24	239	806-824	MULTICOUPLER, 24 CHANNELS	4086.00
RMC800-24A	237	806-824	MULTICOUPLER, 24 CHANNELS	4593.00
RMC800-24K	237	806-824	MULTICOUPLER, 24 CHANNELS	6393.00
RMC800-28	239	806-824	MULTICOUPLER, 28 CHANNELS	4348.00
RMC800-32	239	806-824	MULTICOUPLER, 32 CHANNELS	4617.00
RMC800-4	239	806-824	MULTICOUPLER, 4 CHANNELS	2387.00
RMC800-4N	239	806-824	MULTICOUPLER, 4 CHANNELS	1461.00
RMC800-64	239	806-824	MULTICOUPLER, 64 CHANNELS	7918.00
RMC800-8	239	806-824	MULTICOUPLER, 8 CHANNELS	2662.00
RMC800-8N	239	806-824	MULTICOUPLER, 8 CHANNELS	1700.00
RMC836-16K	235	824-846.5	MULTICOUPLER, 16 CHANNELS TOWER MT	5429.00

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
RMC836-32N24V	233	824-846.5	MULTICOUPLER, 32 CHANNELS NON-WIRE	3949.00
RMC836-32N24V-8	233	824-846.5	MULTICOUPLER, 32 CHANNELS NON-WIRE	4436.00
RMC842-16K	235	835-849	MULTICOUPLER, 16 CHANNELS TOWER MT	5429.00
RMC842-32W24V	233	835-849	MULTICOUPLER, 32 CHANNELS WIRELINE	3949.00
RMC842-32W24V-8	233	835-849	MULTICOUPLER, 32 CHANNELS WIRELINE	4436.00
RMC900-10	239	890-915	MULTICOUPLER, 10 CHANNELS	2807.00
RMC900-10K	237	890-915	MULTICOUPLER, 10 CHANNELS	5293.00
RMC900-20	239	890-915	MULTICOUPLER, 20 CHANNELS	3414.00
RMC900-20K	237	890-915	MULTICOUPLER, 20 CHANNELS	6508.00
RSA880-12D	278	869-896	CELL. COMBINER 12 CH HI-POWER	23656.00
RSA880-16D	278	869-896	CELL. COMBINER 16 CH HI-POWER	32036.00
RSA880-4D	278	869-896	CELL. COMBINER 4 CH HI-POWER	7638.00
RSA880-8C	278	869-896	CELL. COMBINER 8 CH HI-POWER	12040.00
RSA880-8D	278	869-896	CELL. COMBINER 8 CH HI-POWER	15647.00
SJ880-12T	279	806-1000	INTEGRATED COMBINER, 12 CHANNELS	5983.00
SJ880-16T	279	806-1000	INTEGRATED COMBINER, 16 CHANNELS	8019.00
SJ880-4T	279	806-1000	INTEGRATED COMBINER, 4 CHANNELS	1909.00
SJ880-8T	279	806-1000	INTEGRATED COMBINER, 8 CHANNELS	3946.00
SJC880-10CS	285	840-960	SMR COMBINER, 10 CHANNELS HI-POWER	11404.00
SJC880-10CT	285	840-960	SMR COMBINER, 10 CHANNELS	10078.00
SJC880-10T	285	806-1000	INTEGRATED COMBINER, 10 CHANNELS	10078.00
SJC880-12T	279	806-1000	INTEGRATED COMBINER, 12 CHANNELS	11648.00
SJC880-15CS	285	840-960	SMR COMBINER, 15 CHANNELS HI-POWER	22250.00
SJC880-15CT	285	840-960	SMR COMBINER, 15 CHANNELS	17079.00
SJC880-16T	279	806-1000	INTEGRATED COMBINER, 16 CHANNELS	15572.00
SJC880-4T	279	806-1000	INTEGRATED COMBINER, 4 CHANNELS	3797.00
SJC880-5CS	285	840-960	SMR COMBINER, 5 CHANNELS HI-POWER	5357.00
SJC880-5CT	285	840-960	SMR COMBINER, 5 CHANNELS	4694.00
SJC880-5T	285	806-1000	INTEGRATED COMBINER, 5 CHANNELS	4694.00
SJC880-8T	279	806-1000	INTEGRATED COMBINER, 8 CHANNELS	7722.00
SJD880-10CS	285	840-960	SMR COMBINER, 10 CHANNELS HI-POWER	13790.00
SJD880-10CT	285	840-960	SMR COMBINER, 10 CHANNELS	12464.00
SJD880-10T	285	806-1000	INTEGRATED COMBINER, 10 CHANNELS	12464.00
SJD880-12S	NL	806-1000	12 CHAN. COMB. HIGH POWER 150 WATT	15500.00
SJD880-12T	279	806-1000	INTEGRATED COMBINER, 12 CHANNELS	14513.00
SJD880-15CS	285	840-960	SMR COMBINER, 15 CHANNELS HI-POWER	20659.00
SJD880-15CT	285	840-960	SMR COMBINER, 15 CHANNELS	18670.00
SJD880-16S	NL	806-1000	16 CHAN. COMB. HIGH POWER 150 WATT	20750.00
SJD880-16T	279	806-1000	INTEGRATED COMBINER, 16 CHANNELS	19391.00
SJD880-20CS	285	840-960	SMR COMBINER, 20 CHANNELS HI-POWER	27528.00
SJD880-20CT	285	840-960	SMR COMBINER, 20 CHANNELS	24876.00
SJD880-4S	NL	806-1000	HIGH POWER 4 CHAN. COMB. 150 WATT	5000.00
SJD880-4T	279	806-1000	INTEGRATED COMBINER, 4 CHANNELS	4752.00

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
SJD880-5CS	285	840-960	SMR COMBINER, 5 CHANNELS HI-POWER	6550.00
SJD880-5CT	285	840-960	SMR COMBINER, 5 CHANNELS	5887.00
SJD880-5T	285	806-1000	INTEGRATED COMBINER, 5 CHANNELS	5887.00
SJD880-8S	NL	806-1000	HIGH POWER 8 CHAN. COMB. 150 WATT	10250.00
SJD880-8T	279	806-1000	INTEGRATED COMBINER, 8 CHANNELS	9632.00
SJT880-10CS	285	840-960	SMR COMBINER, 10 CHANNELS HI-POWER	16767.00
SJT880-10CT	285	840-960	SMR COMBINER, 10 CHANNELS	15435.00
SJT880-20CS	285	840-960	SMR COMBINER, 20 CHANNELS HI-POWER	33755.00
SJT880-20CT	285	840-960	SMR COMBINER, 20 CHANNELS HI-POWER	29745.00
SJT880-5CS	285	840-960	SMR COMBINER, 5 CHANNELS HI-POWER	8036.00
SJT880-5CT	285	840-960	SMR COMBINER, 5 CHANNELS	7373.00
SJT880-5T	285	806-1000	INTEGRATED COMBINER, 5 CHANNELS	7373.00
SMC880-12	281	851-960	MINI-INTEGRATED COMBINER 12 CH	10417.00
SMC880-16	281	851-960	MINI-INTEGRATED COMBINER 16 CH	14083.00
SMC880-4	281	851-960	MINI-INTEGRATED COMBINER 4 CH	3437.00
SMC880-8	281	851-960	MINI-INTEGRATED COMBINER 8 CH	6989.00
SS880-16	283	869-894	SUB-COMPACT CELL. COMBINER 16 CH	10565.00
SS880-8	283	869-894	SUB-COMPACT CELL. COMBINER 8 CH	5283.00
SS942-16	283	935-960	SUB-COMPACT CELL. COMBINER 16 CH	10565.00
SS942-8	283	935-960	SUB-COMPACT CELL. COMBINER 8 CH	5283.00
SSC880-16	283	869-894	SUB-COMPACT CELL. COMBINER 16 CH	14083.00
SSC880-8	283	894-960	SUB-COMPACT CELL. COMBINER 8 CH	6989.00
SSC942-16	283	935-960	SUB-COMPACT CELL. COMBINER 16 CH	14083.00
SSC942-8	283	935-960	SUB-COMPACT CELL. COMBINER 8 CH	6989.00
TBC078-2	271	66-88	HYBRID COMBINER, 2 CHANNELS	1803.00
TBC078-4	271	66-88	HYBRID COMBINER, 4 CHANNELS	4349.00
TBC150-2	271	136-174	HYBRID COMBINER, 2 CHANNELS	1803.00
TBC150-4	271	136-174	HYBRID COMBINER, 4 CHANNELS	4349.00
TBC460-2	274	406-512	HYBRID COMBINER, 2 CHANNELS	1803.00
TBC460-4	274	406-512	HYBRID COMBINER, 4 CHANNELS	4349.00
TBC800-2	274	806-1000	HYBRID COMBINER, 2 CHANNELS	1316.00
TBC800-4	274	806-1000	HYBRID COMBINER, 4 CHANNELS	3137.00
TBD078-2	271	66-88	HYBRID COMBINER, 2 CHANNELS	2525.00
TBD078-4	271	66-88	HYBRID COMBINER, 4 CHANNELS	5792.00
TBD150-2	271	136-174	HYBRID COMBINER, 2 CHANNELS	2525.00
TBD150-4	271	136-174	HYBRID COMBINER, 4 CHANNELS	5792.00
TBD460-2	274	406-512	HYBRID COMBINER, 2 CHANNELS	2525.00
TBD460-4	274	406-512	HYBRID COMBINER, 4 CHANNELS	5792.00
TBD800-2	274	806-1000	HYBRID COMBINER, 2 CHANNELS	1878.00
TBD800-4	274	806-1000	HYBRID COMBINER, 4 CHANNELS	4262.00
TCC078-2	271	66-88	HYBRID COMBINER, 2 CHANNELS	1989.00
TCC078-4	271	66-88	HYBRID COMBINER, 4 CHANNELS	4795.00
TCC150-2	271	136-174	HYBRID COMBINER, 2 CHANNELS	1989.00

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MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
TCC150-3A	271	136-174	HYBRID COMBINER, 3 CHANNELS	3532.00
TCC150-3S	271	136-174	HYBRID COMBINER, 3 CHANNELS	4349.00
TCC150-4	271	136-174	HYBRID COMBINER, 4 CHANNELS	4795.00
TCC280-2	271	279-281	HYBRID COMBINER, 2 CHANNELS	1989.00
TCC280-4	271	279-281	HYBRID COMBINER, 4 CHANNELS	4795.00
TCC460-2	274	406-512	HYBRID COMBINER, 2 CHANNELS	1989.00
TCC460-3A	274	406-512	HYBRID COMBINER, 3 CHANNELS	3532.00
TCC460-3S	274	406-512	HYBRID COMBINER, 3 CHANNELS	4349.00
TCC460-4	274	406-512	HYBRID COMBINER, 4 CHANNELS	4795.00
TCC800-2	274	806-1000	HYBRID COMBINER, 2 CHANNELS	1501.00
TCC800-3A	274	806-1000	HYBRID COMBINER, 3 CHANNELS	2715.00
TCC800-3S	274	806-1000	HYBRID COMBINER, 3 CHANNELS	3221.00
TCC800-4	274	806-1000	HYBRID COMBINER, 4 CHANNELS	3582.00
TCD078-2	271	66-88	HYBRID COMBINER, 2 CHANNELS	2705.00
TCD078-4	271	66-88	HYBRID COMBINER, 4 CHANNELS	6163.00
TCD150-2	271	136-174	HYBRID COMBINER, 2 CHANNELS	2705.00
TCD150-3A	271	136-174	HYBRID COMBINER, 3 CHANNELS	4583.00
TCD150-3S	271	136-174	HYBRID COMBINER, 3 CHANNELS	5400.00
TCD150-4	271	136-174	HYBRID COMBINER, 4 CHANNELS	6163.00
TCD280-2	271	279-281	HYBRID COMBINER, 2 CHANNELS	2710.00
TCD280-4	271	279-281	HYBRID COMBINER, 4 CHANNELS	6163.00
TCD460-2	274	406-512	HYBRID COMBINER, 2 CHANNELS	2710.00
TCD460-3A	274	406-512	HYBRID COMBINER, 3 CHANNELS	4583.00
TCD460-3S	274	406-512	HYBRID COMBINER, 3 CHANNELS	5400.00
TCD460-4	274	406-512	HYBRID COMBINER, 4 CHANNELS	6163.00
TCD800-2	274	806-1000	HYBRID COMBINER, 2 CHANNELS	2063.00
TCD800-3A	274	806-1000	HYBRID COMBINER, 3 CHANNELS	3527.00
TCD800-3S	274	806-1000	HYBRID COMBINER, 3 CHANNELS	4033.00
TCD800-4	274	806-1000	HYBRID COMBINER, 4 CHANNELS	4633.00
TCD900-5	277	806-960	HYBRID COMBINER, 5 CHANNELS	5887.00
THC150-2	271	136-174	HYBRID COMBINER, 2 CHANNELS	4243.00
THC150-3A	271	136-174	HYBRID COMBINER, 3 CHANNELS	7081.00
THC150-3S	271	136-174	HYBRID COMBINER, 3 CHANNELS	8142.00
THC150-4	271	136-174	HYBRID COMBINER, 4 CHANNELS	9547.00
THC460-2	274	406-512	HYBRID COMBINER, 2 CHANNELS	2758.00
THC460-3A	274	406-512	HYBRID COMBINER, 3 CHANNELS	3766.00
THC460-3S	274	406-512	HYBRID COMBINER, 3 CHANNELS	4827.00
THC460-4	274	406-512	HYBRID COMBINER, 4 CHANNELS	5622.00
THC800-2	274	806-1000	HYBRID COMBINER, 2 CHANNELS	2758.00
THC800-4	274	806-1000	HYBRID COMBINER, 4 CHANNELS	5410.00
THD150-2	271	136-174	HYBRID COMBINER, 2 CHANNELS	6842.00
THD150-3A	271	136-174	HYBRID COMBINER, 3 CHANNELS	10979.00
THD150-3S	271	136-174	HYBRID COMBINER, 3 CHANNELS	12040.00

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MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
THD150-4	271	136-174	HYBRID COMBINER, 4 CHANNELS	14745.00
THD460-2	274	406-512	HYBRID COMBINER, 2 CHANNELS	4137.00
THD460-3A	274	406-512	HYBRID COMBINER, 3 CHANNELS	6789.00
THD460-3S	274	406-512	HYBRID COMBINER, 3 CHANNELS	7850.00
THD460-4	274	406-512	HYBRID COMBINER, 4 CHANNELS	9335.00
THD800-2	274	806-1000	HYBRID COMBINER, 2 CHANNELS	3787.00
THD800-4	274	806-1000	HYBRID COMBINER, 4 CHANNELS	8423.00
TJC150-10	293	136-174	CAVITY COMBINER, 10 CHANNELS	11669.00
TJC150-2	293	136-174	CAVITY COMBINER, 2 CHANNELS	2970.00
TJC150-3	293	136-174	CAVITY COMBINER, 3 CHANNELS	3925.00
TJC150-4	293	136-174	CAVITY COMBINER, 4 CHANNELS	4880.00
TJC150-5	293	136-174	CAVITY COMBINER, 5 CHANNELS	5834.00
TJC460-10	290	406-512	CAVITY COMBINER, 10 CHANNELS	11138.00
TJC460-2	290	406-512	CAVITY COMBINER, 2 CHANNELS	2864.00
TJC460-3	290	406-512	CAVITY COMBINER, 3 CHANNELS	3766.00
TJC460-4	290	406-512	CAVITY COMBINER, 4 CHANNELS	4668.00
TJC460-5	290	406-512	CAVITY COMBINER, 5 CHANNELS	5569.00
TJC800-10S	287	806-1000	CAVITY COMBINER, 10 CHANNELS	11934.00
TJC800-10T	287	806-1000	CAVITY COMBINER, 10 CHANNELS	10608.00
TJC800-2S	287	806-1000	CAVITY COMBINER, 2 CHANNELS	2960.00
TJC800-2T	287	806-1000	CAVITY COMBINER, 2 CHANNELS	2695.00
TJC800-3S	287	806-1000	CAVITY COMBINER, 3 CHANNELS	4195.00
TJC800-3T	287	806-1000	CAVITY COMBINER, 3 CHANNELS	3511.00
TJC800-4S	287	806-1000	CAVITY COMBINER, 4 CHANNELS	4858.00
TJC800-4T	287	806-1000	CAVITY COMBINER, 4 CHANNELS	4328.00
TJC800-5S	287	806-1000	CAVITY COMBINER, 5 CHANNELS	5808.00
TJC800-5T	287	806-1000	CAVITY COMBINER, 5 CHANNELS	5145.00
TJC880-8T	287	806-1000	CAVITY COMBINER, 8 CHANNELS	8656.00
TJD150-10	293	136-174	CAVITY COMBINER, 10 CHANNELS	14851.00
TJD150-2	293	136-174	CAVITY COMBINER, 2 CHANNELS	3607.00
TJD150-3	293	136-174	CAVITY COMBINER, 3 CHANNELS	4880.00
TJD150-4	293	136-174	CAVITY COMBINER, 4 CHANNELS	6153.00
TJD150-5	293	136-174	CAVITY COMBINER, 5 CHANNELS	7426.00
TJD460-10	290	406-512	CAVITY COMBINER, 10 CHANNELS	14321.00
TJD460-2	290	406-512	CAVITY COMBINER, 2 CHANNELS	3501.00
TJD460-2N	290	406-512	CAVITY COMBINER, 2 CHANNELS	3607.00
TJD460-3	290	406-512	CAVITY COMBINER, 3 CHANNELS	4721.00
TJD460-3N	290	406-512	CAVITY COMBINER, 3 CHANNELS	4880.00
TJD460-4	290	406-512	CAVITY COMBINER, 4 CHANNELS	5940.00
TJD460-4N	290	406-512	CAVITY COMBINER, 4 CHANNELS	6153.00
TJD460-5	290	406-512	CAVITY COMBINER, 5 CHANNELS	7160.00
TJD460-5N	290	406-512	CAVITY COMBINER, 5 CHANNELS	7426.00
TJD800-10T	287	806-1000	CAVITY COMBINER, 10 CHANNELS	12995.00

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
TJD800-2S	287	806-1000	CAVITY COMBINER, 2 CHANNELS	3437.00
TJD800-2T	287	806-1000	CAVITY COMBINER, 2 CHANNELS	3172.00
TJD800-3S	287	806-1000	CAVITY COMBINER, 3 CHANNELS	4911.00
TJD800-3T	287	806-1000	CAVITY COMBINER, 3 CHANNELS	4227.00
TJD800-4S	287	806-1000	CAVITY COMBINER, 4 CHANNELS	5813.00
TJD800-4T	287	806-1000	CAVITY COMBINER, 4 CHANNELS	5283.00
TJD800-5S	287	806-1000	CAVITY COMBINER, 5 CHANNELS	7001.00
TJD800-5T	287	806-1000	CAVITY COMBINER, 5 CHANNELS	6338.00
TJD800-8S	287	806-1000	CAVITY COMBINER, 8 CHANNELS	11944.00
TJD800-8T	287	806-1000	CAVITY COMBINER, 8 CHANNELS	10883.00
TJD880-10S	287	806-1000	CAVITY COMBINER, 10 CHANNELS	14135.00
TJT150-10	293	136-174	CAVITY COMBINER, 10 CHANNELS	18034.00
TJT150-2	293	136-174	CAVITY COMBINER, 2 CHANNELS	4243.00
TJT150-3	293	136-174	CAVITY COMBINER, 3 CHANNELS	5834.00
TJT150-4	293	136-174	CAVITY COMBINER, 4 CHANNELS	7426.00
TJT150-5	293	136-174	CAVITY COMBINER, 5 CHANNELS	9017.00
TJT460-10	290	406-512	CAVITY COMBINER, 10 CHANNELS	17503.00
TJT460-2	290	406-512	CAVITY COMBINER, 2 CHANNELS	4137.00
TJT460-3	290	406-512	CAVITY COMBINER, 3 CHANNELS	5675.00
TJT460-4	290	406-512	CAVITY COMBINER, 4 CHANNELS	7213.00
TJT460-5	290	406-512	CAVITY COMBINER, 5 CHANNELS	8752.00
TJT800-10S	287	806-1000	CAVITY COMBINER, 10 CHANNELS	16708.00
TJT800-10T	287	806-1000	CAVITY COMBINER, 10 CHANNELS	15382.00
TJT800-2S	287	806-1000	CAVITY COMBINER, 2 CHANNELS	3915.00
TJT800-2T	287	806-1000	CAVITY COMBINER, 2 CHANNELS	3650.00
TJT800-3S	287	806-1000	CAVITY COMBINER, 3 CHANNELS	5627.00
TJT800-3T	287	806-1000	CAVITY COMBINER, 3 CHANNELS	4943.00
TJT800-4S	287	806-1000	CAVITY COMBINER, 4 CHANNELS	6768.00
TJT800-4T	287	806-1000	CAVITY COMBINER, 4 CHANNELS	6237.00
TJT800-5S	287	806-1000	CAVITY COMBINER, 5 CHANNELS	8195.00
TJT800-5T	287	806-1000	CAVITY COMBINER, 5 CHANNELS	7532.00
TJT800-8S	287	806-1000	CAVITY COMBINER, 8 CHANNELS	13854.00
TJT800-8T	287	806-1000	CAVITY COMBINER, 8 CHANNELS	12793.00
TLC150-4	293	136-174	CAVITY COMBINER, 4 CHANNELS	5495.00
TLC150-8	293	136-174	CAVITY COMBINER, 8 CHANNELS	10989.00
TLC280-4	293	279-281	CAVITY COMBINER, 4 CHANNELS	5495.00
TLC460-4	290	406-512	CAVITY COMBINER, 4 CHANNELS	5495.00
TLC460-8	290	406-512	CAVITY COMBINER, 8 CHANNELS	10989.00
TLD150-4	293	136-174	CAVITY COMBINER, 4 CHANNELS	6768.00
TLD150-8	293	136-174	CAVITY COMBINER, 8 CHANNELS	13535.00
TLD280-4	293	279-281	CAVITY COMBINER, 4 CHANNELS	6768.00
TLD460-4	290	406-512	CAVITY COMBINER, 4 CHANNELS	6768.00
TLD460-8	290	406-512	CAVITY COMBINER, 8 CHANNELS	13535.00

PRICE LIST EFFECTIVE October 9, 1992 SUPERSEDES ALL PREVIOUS PRICE LIST

MODEL NUMBER	CAT. PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
TLT150-4	293	136-174	CAVITY COMBINER, 4 CHANNELS	8041.00
TLT150-8	293	136-174	CAVTIY COMBINER, 8 CHANNELS	16081.00
TLT460-4	290	406-512	CAVITY COMBINER, 4 CHANNELS	8041.00
TLT460-8	290	406-512	CAVITY COMBINER, 8 CHANNELS	16081.00
UG1185/U	166		TYPE N MALE CONNECTOR	7.00
UG1186/U	166		TYPE N FEMALE CONNECTOR	11.00

OPTIONS FOR BASE STATION ANTENNA PRODUCTS

INVERT OPTI	NL		INVERT OPTION FOR CELLULAR ANT.	130.00
OPTION C	NL		C CONN. TO REPLACE TYPE-N	375.00
OPTION E	NL		EIA CONN. TO REPLACE TYPE-N	375.00
OPTION S	NL		7/16" CONN. TO REPLACE TYPE-N	375.00

OPTIONS FOR PENETRATOR(tm) PRODUCTS

B1			B1 ANGLE MOUNTING BRACKET W/HDWR	310.00
J CABLE			OPTION J ADDITIONAL TILT CABLE	232.00
OPTION C			C CONNECTOR TERMINATION 1000 WATT	400.00
OPTION EIA			7/8 EIA FLANGE 1000 WATT	400.00
OPTION HW			HIGH WIND RATED	1500.00
OPTION I			INVERTED PENETRATOR	300.00
OPTION J			FIELD AJUSTABLE BEAM TILT	1000.00
OPTION L			TAILORED VERTICAL BEAM	1500.00
OPTION LC	NL		LC CONNECTOR 1000 WATTS	412.00

To Order Call:
1-800-321-4700

To FAX Orders:
615-641-1910

Numbers 1-19
Celwave Sales
Representatives
See list below.

Celwave Regional Sales Managers

Northeast: David Strauss
Route 79, Marlboro, NJ 07746, Tel: (908) 462-1880

Northwest: Alan Leffler
962 W. 500 So., Cedar City, UT 84720, Tel: (801) 586-9809

Southeast: Jim Hammett
1430 Gould Blvd., Lavergne, TN 37086, Tel: (615) 641-1911

Southwest: Ray Long
115 E. Watkins St., Phoenix, AZ 85004-2925, Tel: (602) 252-8058

North Central: James Bottomley
939 N. Plum Grove Rd., Suite E, Schaumburg, IL 60173
Tel: (708) 517-7511

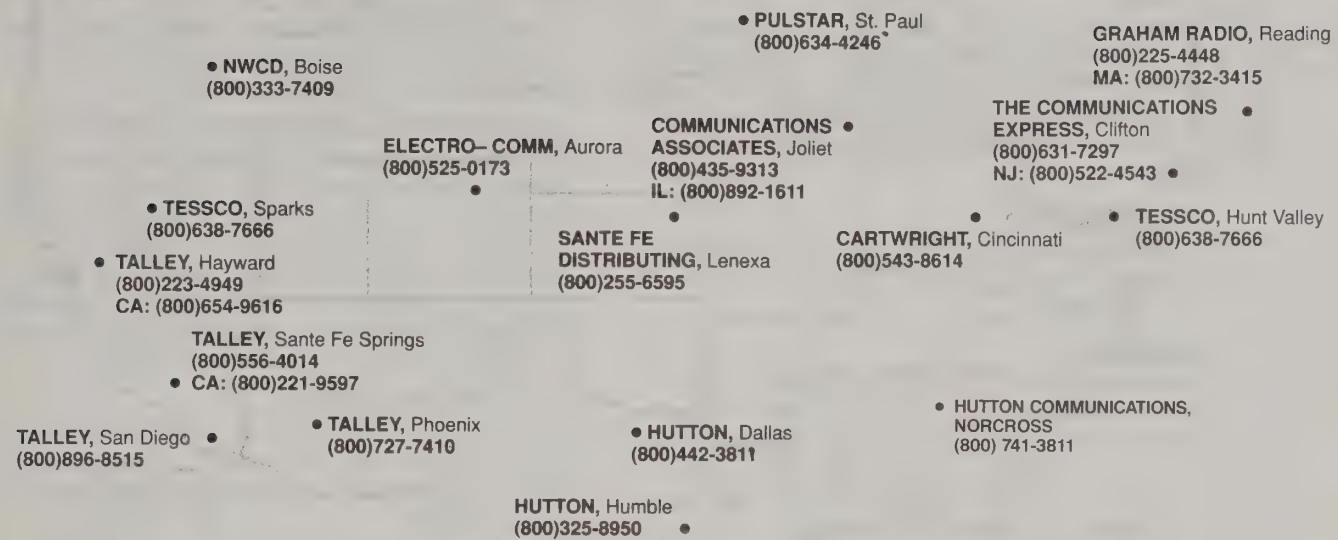
South Central: Tom Bresnahan
2000 E. Lamar Blvd., Arlington, TX 76006, Tel: (817) 469-8118

International Sales
Route 79, Marlboro, NJ 07746
Tel: (908) 462-1880 • FAX: (908) 431-8388

Land Mobile and Marine Sales Representatives–See Map for Service Areas

1. **Engelhardt Associates** (Land Mobile)
   50 Timber Ln., P.O. Box 1170, Laconia, NH 03247
   Tel: (603) 524-7793 • FAX (603) 527-0892
2. **PMC Associates** (Land Mobile)
   9 Westlake Ct., Somerset, NJ 08873
   Tel: (908) 563-0366 • FAX: (908) 563-9174
3. **PMC Associates** (Land Mobile)
   9 Westlake Ct., Somerset, NJ 08873
   Tel: (908) 563-0366 • FAX: (908) 563-9174
4. **Communications Marketing Southeast, Inc.** (Land Mobile)
   2341 Habersham Dr., P.O. Box 823, Marietta, GA 30061
   Tel: (404) 424-9097
5. **Communications Marketing Associates** (Land Mobile)
   5405 Weywood Dr., Reisterstown, MD 21136-4501
   Tel: 800-800-0041 • FAX: 800-800-0041
6. **MacCom Inc.** (Land Mobile)
   4420 NE 20th Ave., Suite H, Ft. Lauderdale, FL 33308
   Tel: (305) 772-3025 • FAX: (305) 772-1919
7. **Dick Buss & Associates** (Land Mobile/Marine)
   221 High St., P.O. Box 225, Mineral Point, WI 53565
   Tel: (608) 987-2100 • FAX: (608) 987-2431
8. **SPI Communications** (Land Mobile/Marine)
   4500 W. 90th Terrace #306, Prairie Village, KS 66207
   Tel: 800-825-1403 • FAX (913) 649-6242
9. **Midwest Representatives, Inc.** (Land Mobile/Marine)
   1600 Irongate Circle, Zionsville, IN 46077
   Tel: (317) 844-4555 • FAX: (317) 873-6145
10. **Select Sales, Inc.** (Land Mobile/Marine)
    2945 Garfield Ave. S., Minneapolis, MN 55408
    Tel: (612) 827-3637 • FAX: (612) 827-5263
11. **W.E. Price & Co.** (Land Mobile/Marine)
    3060 Townline Rd., P.O. Box 306, Houghton Lake, MI 48629
    Tel: (517) 366-8702 • FAX: (517) 366-8495
12. **Thomas Shelby & Co., Inc.** (Land Mobile/Marine)
    309 South Park Dr., St. Mary's, OH 45885
    Tel: (419) 394-3377 • FAX: (612) 827-5263
13. **Mountain Representatives, Inc.,** (Land Mobile/Marine)
    1180 Colorado Blvd., #7, Denver, CO 80206
    Tel: (303) 333-7745 • FAX: (303) 333-7063
14. **Bert Moore & Associates** (Land Mobile/Marine)
    P.O. Box 680, North Hollywood, CA 91603
    Tel: (213) 877-5955 • FAX: (818) 980-4847
15. **Dave Leonard Co.** (Land Mobile/Marine)
    632 No. Tomahawk Island Dr., Portland, OR 97217
    Tel: (503) 286-7700
16. **Martin-Cavender Co., Inc.** (Land Mobile/Marine)
    6440 N. Central Expressway, Suite #514
    P.O. Box 820667, Dallas, TX 75382
    Tel: (214) 363-3574 • FAX: (214) 369-9150
17. **PROCOMM Marketing, Inc.** (Land Mobile/Marine)
    286 Greenhouse Market Place, #351, San Leandro, CA 94579
    Tel: (415) 352-9195
18. **Commar Sales** (Marine–Entire N.E. U.S.)
    1100 Main Rd., Westport, MA 02790
    Tel: (508) 636-6961
19. **Commar Inc.** (Marine–Entire S.E. U.S.)
    2477 S.E. Renick Ave., Port St. Lucie, FL 34952
    Tel: (407) 337-3673

National Distributors



Cartwright Communications Co.
7812 Red Sky Dr.
Cincinnati, OH 45249-1696
(800)543-8614

Communications Associates, Inc.
305 N. Republic Ave.
Joliet, IL 60434
(800)435-9313
IL:(800)892-1611

The Communications Express
P.O. Box 1158
Clifton, NJ 07014
(800)631-7297
NJ: (800)522-4543

Electro-Comm Distributing Inc.
600 Telluride St., #A
Aurora, CO 80011
(800)525-0173

Graham Radio
505 Main Street
Reading, MA 01867
Eastern U.S.: (800)225-4448
MA: (800)732-3415

Hutton Communications
4112 Billy Mitchell Dr.
Dallas, TX 75244-2315
Dallas: (800) 442-3811
Humble: (800) 325-8950
Norcross: (800) 741-3811

Northwest Communications Distributors
1976 Century Way
Boise, ID 83709
(800)333-7409

Pulstar Distributing, Inc.
285 North Snelling Ave.
St. Paul, MN 55105
(800)634-4246

Talley Electronics, Co., Inc.
11824 East Hamden Place
Santa Fe Springs, CA 90670
(800)556-4014
CA: (800)221-9597
Hayward: (800)223-4949
CA: (800)654-9616
San Diego: (800)869-8515
Phoenix: (800)727-7410

Tessco
10999 Mc Cormick Rd.
Hunt Valley, MD 21030
Hunt Valley: (800) 638-7666
Sparks: (800) 638-7666

Sante Fe Distributing
14400 W. 97th Terrace
Lenexa, KS 66215
(800)255-6595

Terms and Conditions of Sale

Effective October 9, 1992

Prices:
Prices listed are F.O.B. Seller's plants and are subject to change without notice. Terms are net 30 days from date of invoice with a minimum order of $100.00. Prices include the cost of Standard Domestic Packing. If Export Packing is required, an additional charge will be made.

Credit Approval:
Orders are subject to the approval of Seller's Credit Department. Call the Credit Department at 908-462-1880.

Shipments:
Shipments are made with transportationb charges collect unless otherwise specified by the Buyer. Buyer's routing is used where practicable. Shipments are routed according to Seller's best judgement unless carrier is specified by Buyer. The Seller is not held responsible for selecting cheapest or fastest routing.

Acceptance of Order:
Orders are valid only when accepted at Seller's Marlboro, NJ or Nashville, TN office.

Quotations:
Only written quotations are valid.

Claims for Damage or Loss in Transit:
Claims for damage or loss while material is in transit must be made against the carrier by the Buyer.

Claims for Shortage:
Claims for shortages must be made within thirty days after date of shipment of material from Seller's plants.

Specification Changes:
All designs and specifications of Seller's products are subject to change without notice provided the changes do not materially affect performance.

Returned Material:
Written authorization must be obtained before returning material. Credit not exceeding 80% of the original price is allowed on unused material provided it is returned prepaid and in new condition. In no case will Seller authorize return of material more than ninety days after shipment from Seller's plant. Credit for returned material is issued by the Seller only to the original purchaser. Call 1-800-321-4700 for Customer Service.

Cable Shipping Reels:
Non-returnable cable reels are supplied free of charge for cable lengths 500 feet or more. For lengths less than 500 feet, reels can be supplied on request for an additional charge.

Prices and Taxes:
Prices listed herein do not include Federal, State or Local sales or excise taxes.

Delays or Inability to Perform:
The Seller is not liable for delays or inability to fulfill contractual obligations when the causes thereof are beyond the reasonable control of the Seller.

Cancellation or Change in Acknowledged Orders:
Cancellation of or changes to acknowledged orders by the Buyer are accepted only upon terms that protect Seller against loss.

Limited Warranty

The Seller warrants that, at the time of shipment, the products manufactured by the Seller are free from defects in material and workmanship. The Seller's obligation under this warranty is limited to replacement or repair of such products within one year from the date of shipment. No material is accepted for replacement or repair without written authority of the Seller. Replacement or repair is made only after an examination at the Seller's plant shows defective material or workmanship at the time of manufacture. All shipping charges on the returned material must be prepaid by the Buyer.

Seller is in no event liable for consequential damages, installation costs or other costs of any nature as a result of the use of the products manufactured by the Seller, whether used in accordance with instructions or not. The Seller is not liable for replacement of any products damaged by lightning.

This warranty is in lieu of all others, either expressed or implied. No representative is authorized to assume for the Seller any other liability in connection with the Seller's products.

Flexwell® and Glass Advantage® are Registered Trademarks of Radio Frequency Systems, Inc. Stationmaster™, Guardian™, Cellflex™, Cellular Advantage™, Elevated Advantage™ and Peak Advantage™ are Trademarks of Radio Frequency Systems, Inc.
Seller is not responsible for typographical errors in this price list.

CELWAVE RFS

DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • 1-800-321-4700 • FAX: 615-641-1910

Printed in U.S.A.

9/1-25M

PHONE: 1-800-321-4700

CELWAVE

FAX: 1-615-641-1910

PRICE LIST ADDENDUM

PRICE LIST EFFECTIVE DATE October 9, 1992 *SUPERSEDES ALL PREVIOUS PRICE LIST*

MODEL NUMBER	PRICE LIST PAGE	FREQ. (MHz)	DESCRIPTION	LIST PRICE
NEW BDA PRODUCTS				
48522-N	NL	896-941	BI-DIRECTIONAL AMPLIFIER, WALL MOUNT	14600.00
48532	NL	825-880	BDA, A-BAND RACK MOUNT	13790.00
48532-N	NL	825-880	BDA, A-BAND WALL MOUNT	14300.00
48535	NL	835-890	BDA, B-BAND RACK MOUNT	13790.00
48535-N	NL	835-890	BDA, B-BAND WALL MOUNT	14300.00
48541	NL	824-894	BDA, FULL CELLULAR RACK MOUNT	14000.00
48542	NL	825-880	BDA, A-BAND RACK MOUNT 24 VDC	13154.00
48542-N	NL	825-880	BDA, A-BAND WALL MOUNT 24 VDC	13664.00
48543	NL	835-894	BDA, B-BAND W/EXT. RACK MOUNT	13790.00
48543-N	NL	835-894	BDA, B-BAND W/EXT. WALL MOUNT	14300.00
48544	NL	835-894	BDA, B-BAND W/EXT. RACK MOUNT 24 VDC	13154.00
48544-N	NL	835-894	BDA, B-BAND W/EXT. WALL MOUNT 24 VDC	13664.00
48545	NL	835-890	BDA, B-BAND RACK MOUNT 24 VDC	13154.00
48545-N	NL	835-890	BDA, B-BAND WALL MOUNT 24 VDC	13664.00
48546	NL	824-891.5	BDA, A-BAND W/EXT. RACK MOUNT	13890.00
48547	NL	824-891.5	BDA, A-BAND W/EXT. RACK MOUNT 24 VDC	13254.00
48548	NL	824-894	BDA, FULL CELLULAR RACK MOUNT 24 VDC	13364.00
48561	NL	806-869	BDA, 5 MHz RACK MOUNT	13690.00
48561-N	NL	806-869	BDA, 5 MHz WALL MOUNT	14200.00
CABLE PRODUCTS				
810910-001	4		1/2" FLEXWELL AIR, HCC12-50J	3.89
810903-001	4		1-5/8" FLEXWELL AIR, HCC158-50J	16.22
810905-001	5		3" FLEXWELL AIR, HCC300-50J	28.08
810907-008	5		1/2" LLFLEX, HCF 12-50JCu2Y	3.64
810916-001	5		1-1/4" CELLFLEX FOAM, FLC114-50J	10.94
810916-007	5		1-1/4" FIRE RETARDANT, FOAM CABLE	13.57
810918-001	5		1/2" CELLFLEX FOAM, FLC12-50J	2.50
810918-007	5		1/2" FIRE RETARDANT, FOAM CABLE	3.31
810920-001	5		1-5/8" CELLFLEX FOAM, FLC158-50J	14.87
810920-007	5		1-5/8" FIRE RETARDANT, FOAM CABLE	17.64
810921-001	5		7/8" CELLFLEX FOAM, FLC78-50J	6.18
810921-007	5		7/8" FIRE RETARDANT, FOAM CABLE	7.76
810929-001	5		7/8" FLEXWELL AIR, HCC78-50J	7.54
BASE STATION PROD.				
OPTION S	34		7/16" CONNECTOR TO REPLACE TYPE-N	150.00

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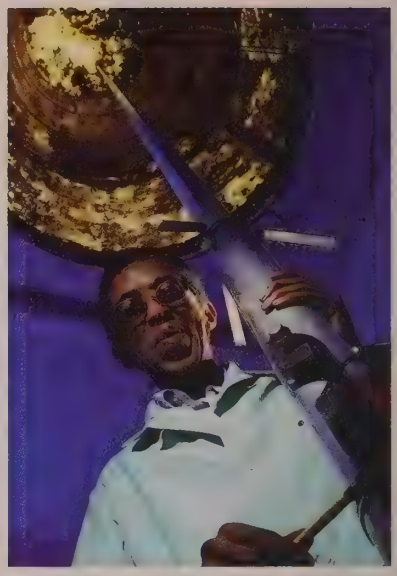


Let's talk about your future ...

As your need for new products to meet new technologies develop, Celwave is ready to satisfy those needs. Often, we anticipate them.

This foresight is exemplified by our ever-expanding line of premium quality antennas, cavity devices, duplexers, Tx combiners, Rx multicouplers, cable and accessories.

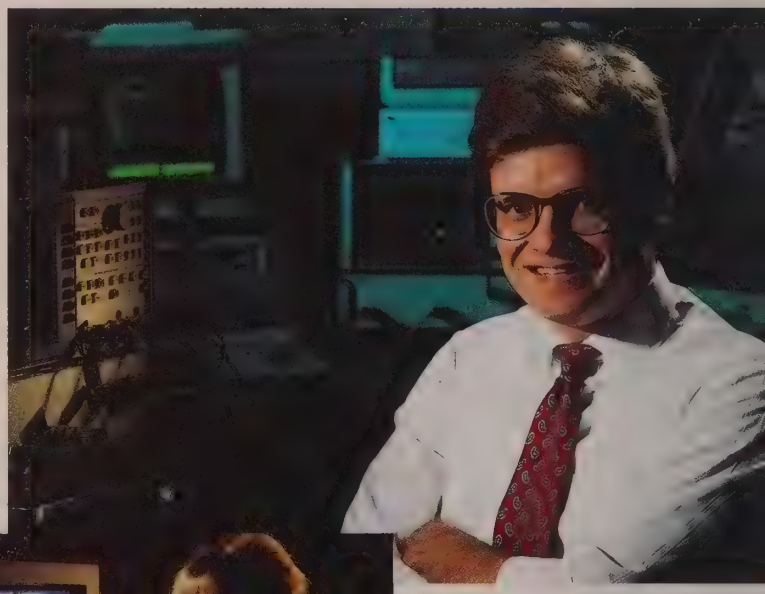
As a member company in Radio Frequency Systems Inc. – RFS – our focus is to serve the Radio Frequency Transmission markets worldwide. RFS member companies in Australia, Brazil, Denmark, France, Germany and the U.S.A. pool technical and manufacturing resources for our customers' benefit.

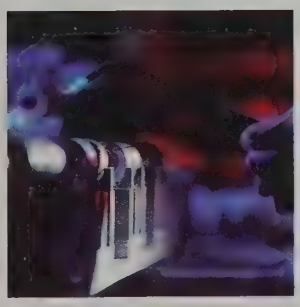
In our constant monitoring of the marketplace, we maintain strong relationships with radio equipment manufacturers, land mobile distributors and system operators.

As a result, our reputation for advanced design capability, reliable product, delivery, research and development, customer service and application support is deservedly unsurpassed.

Celwave is purely customer driven. We are intently focused on Total Quality. We strive for customer satisfaction by identifying and understanding your requirements, and satisfying those requirements for communications systems of all kinds, all over the world.

What can we do for you?





They were talking so much they weren't getting the message.

More Hong Kong citizens use pagers than in any other metropolitan area of the world. They use them 24 hours a day, 365 days a year and expect efficient service without interruption.

They weren't getting it from 535 separate transmitters operating on 14 VHF frequencies at 44 different transmitter sites.

Within days after being called in, Celwave's Systems Engineering people had designed a customized system that included intermodulation analysis, a mechanical layout and specifications for minimizing insertion loss with maximum isolation.

Within weeks, the unmergable had been merged without any interruption of service. Over a million calls a day were getting through with no busy signals and the paging service company was projecting a market-share growth of 15% to 20% a year.

Celwave has designed and equipped antenna systems to meet all kinds of needs all over the world. Sometime soon, we could do the same for you.

CELWAVE RFS

DIVISION OF RADIO FREQUENCY SYSTEMS

Let's talk about your future.

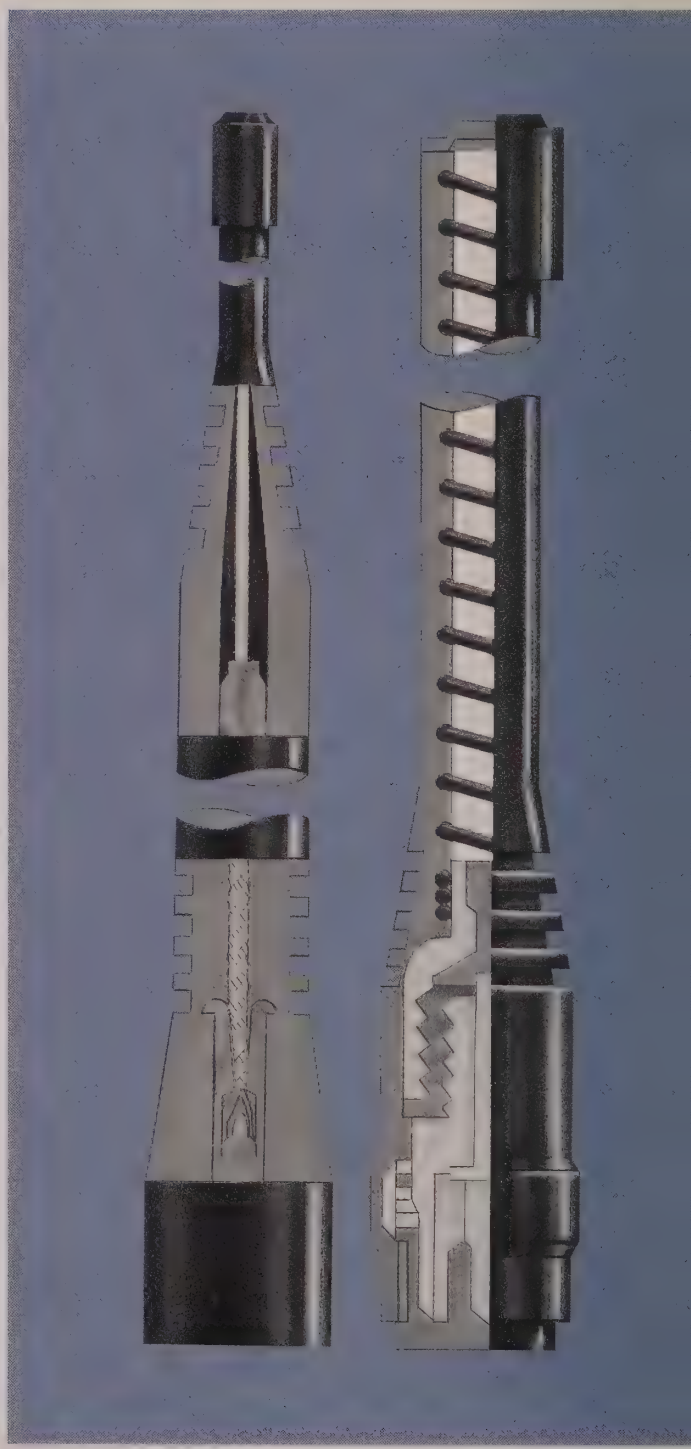
©1990 Radio Frequency Systems, Inc.

EAGLE SERIES
Molded Professional Portable Antennas

Better Bird.
Better Features.

All of which make the Eagle cost a little more while making the duck an endangered species.

- **Injection molded in durable, yet stylish polyurethane.**
- **Fully encapsulated element to prevent shorting and corrosion.**
- **Designed and tested for 5-year life cycle.**
- **Connector is skirt sealed against dirt, chemicals and other contaminants.**
- **Preplated copper element over high carbon steel for maximum radiation.**
- **Hand cut for required frequency to ±5 MHz for best VSWR.**
- **One piece molded construction covers antenna and connector boot for sleeker, more attractive look.**
- **Connector plated for maximum conductivity and corrosion protection. The BNC and TNC connectors have gold plated floating center pin.**



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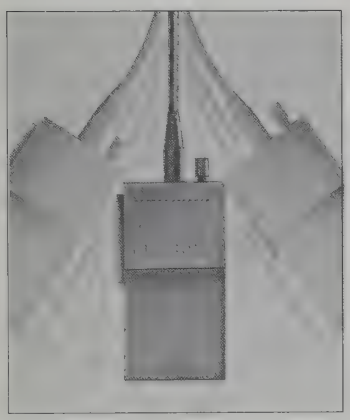
EAGLE SERIES
Molded Professional Portable Antennas

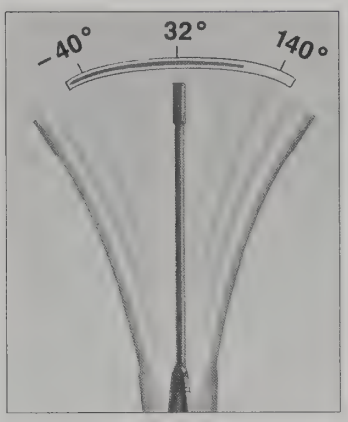
If there's a tougher breed of molded, portable radio antennas, it hasn't been born yet.

The Eagle soared through a whole series of tests run by people who didn't care whether it flew or flopped...



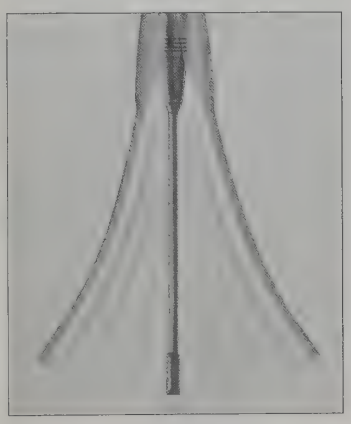
The 2,000,000 Hit Marathon

Held at its base, the Eagle was smacked two million times in its mid-section. One million 90° bends to the right. Another million 90° bends to the left. The beating never even ruffled its feathers.



The Low Temperature Bend.

First, a thousand hits during a temperature cycle of 32°F to 140°F. Then, after a three-hour cool down to lower its body temperature to -40°F, a quick 90° bend failed to break the Eagle's neck or crack its hide.

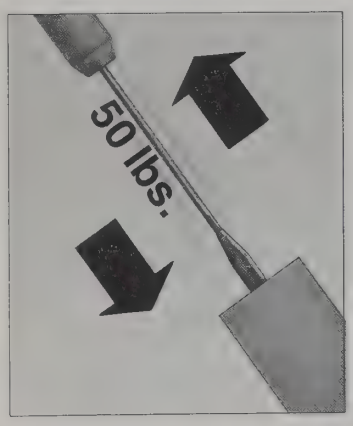


The Swinging Pendulum Test.

Hanging by its neck and attached to 2-1/2 pounds of weight, the Eagle was whipped from vertical to 45° horizontal a total of 130,000 times. Our bird never lost its grip.

The Four Foot Nose Dive.

Dropped not once, but five times, with a full size radio attached, the impact didn't so much as dent the Eagle's beak.



The 50 Pound Pull.

Anchored to an immovable object and held below its tip, the Eagle was subjected to a pull of fifty pounds. That's 45 pounds more than if it were used to yank a radio out of its case.

The Corrosive Salt Shower.

Not a once-over-lightly bird bath, but two hours soaking was duck soup for the Eagle. After the wetting down it still had all the right connections, and no corrosion.

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Eagle Series

118-174 MHz

Helical Style 118-174 MHz

Designed and rigorously tested with a 5-year design life, this molded professional portable antenna is factory tuned to the required frequency band for best VSWR. Projection molded in durable polyurethane, this one piece antenna features a fully encapsulated element and a plated, skirt sealed connector to prevent shorting and corrosion. VHF helical style models are available with BNC (M), 5/16" - 32 x 1/2" (M), 12-28 (F), and TNC (M) connectors. BNC and TNC connectors have gold plated floating center pin.

SPECIFICATIONS

Maximum Power - Watts	20
Impedance - Ohms	50 nominal*
Temperature Range - °F(°C)	Operating Temperature $^{-}22°$ to $^{+}140°$ ($^{-}30°$ to $^{+}60°$)

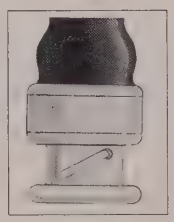
*Varies with ground plane provided by individual portable.

Ordering Information

If you require something other than the standard configurations listed, we will work with you to design an antenna to suit your special requirements. Contact our Customer Service Department for information.

VHF HELICAL FREQUENCY	CONNECTOR	ITEM NO.
118-127 MHz	BNC-male	B118B
	5/16" - 32 x 1/2" male	B118H
	12 - 28 female	B118M
	TNC male	B118T
127-136 MHz	BNC-male	B127B
	5/16" - 32 x 1/2" male	B127H
	12 - 28 female	B127M
	TNC-male	B127T
136-144 MHz	BNC-male	B136B
	5/16" - 32 x 1/2" male	B136H
	12 - 28 female	B136M
	TNC-male	B136T
144-148 MHz	BNC-male	B144B
	5/16" - 32 x 1/2" male	B144H
	12 - 28 female	B144M
	TNC-male	B144T
148-155 MHz	BNC-male	B148B
	5/16" - 32 x 1/2" male	B148H
	12 - 28 female	B148M
	TNC-male	B148T
155-164 MHz	BNC-male	B155B
	5/16" - 32 x 1/2" male	B155H
	12 - 28 female	B155M
	TNC-male	B155T
164-174 MHz	BNC-male	B164B
	5/16" - 32 x 1/2" male	B164H
	12 - 28 female	B164M
	TNC-male	B164T

Connectors



BNC

5/16" - 32 x 1/2"

12-28

TNC

CELWAVE RFS
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Eagle Series

406-512 MHz

Helical Style	406-512 MHz
Quarter-wave Whip	406-512 MHz

These UHF one piece portable antennas are available in both helical and quarter-wave whip styles. Designed and rigorously tested with a 5-year design life, the antennas are factory tuned to the frequency band for best VSWR. Injection molded in durable polyurethane, they feature a fully encapsulated element and a plated, skirt sealed connector to prevent shorting and corrosion. Helical and quarter-wave antennas are available with BNC (M), 5/16" - 32 x 1/2" (M), 1/4" - 32 x 3/16" (M), and TNC (M) connectors. BNC and TNC connectors have gold plated floating center pin.

SPECIFICATIONS

Maximum Power - Watts	20
Impedance - Ohms	50 nominal*
Temperature Range - °F (°C)	Operating Temperature $^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)

*Varies with ground plane provided by individual portable.

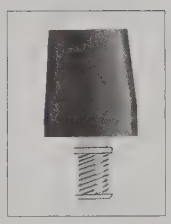
Ordering Information

If you require something other than the standard configurations listed, we will work with you to design an antenna to suit your special requirements. Contact our Customer Service Department for information.

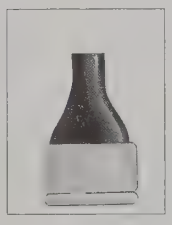
FREQUENCY	CONNECTOR	UHF HELICAL ITEM NO.	UHF QUARTER-WAVE ITEM NO.
406-420 MHz	BNC-male	C406B	D406B
	5/16" – 32 x 1/2" male	C406H	D406H
	1/4" – 32 x 3/16" male	C406X	D406X
	TNC-male	C406T	D406T
420-450 MHz	BNC-male	C420B	D420B
	5/16" – 32 x 1/2" male	C420H	D420H
	1/4" – 32 x 3/16" male	C420X	D420X
	TNC-male	C420T	D420T
450-470 MHz	BNC-male	C450B	D450B
	5/16" – 32 x 1/2" male	C450H	D450H
	1/4" – 32 x 3/16" male	C450X	D450X
	TNC-male	C450T	D450T
470-512 MHz	BNC-male	C470B	D470B
	5/16" – 32 x 1/2" male	C470H	D470H
	1/4" – 32 x 3/16" male	C470X	D470X
	TNC-male	C470T	D470T

Connectors

BNC


5/16" - 32 x 1/2"

1/4" - 32 x 3/16"


TNC

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Eagle Series

800-960 MHz

Quarter-wave Whip	806-896 MHz
Half-wave Whip	806-896 MHz
800 MHz Dipole	806-896 MHz
Half-wave Dipole	800-960 MHz

These one piece portable antennas are available at 800 MHz for trunking and cellular applications. Designed and rigorously tested with a 5-year design life, they are factory tuned to the required frequency band for best VSWR. Injection molded in durable polyurethane, these antennas feature a fully encapsulated element and a plated, skirt sealed connector to prevent shorting and corrosion. Half-wave dipole, 800 MHz dipole, half-wave whip, and quarter-wave whip style are available with a variety of connector options for both trunking and cellular applications.

SPECIFICATIONS

Maximum Power - Watts	20
Impedence - Ohms	50 nominal*
Temperature Range - °F (°C)	Operating Temperature $^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)

*Varies with ground plane provided by individual portable.

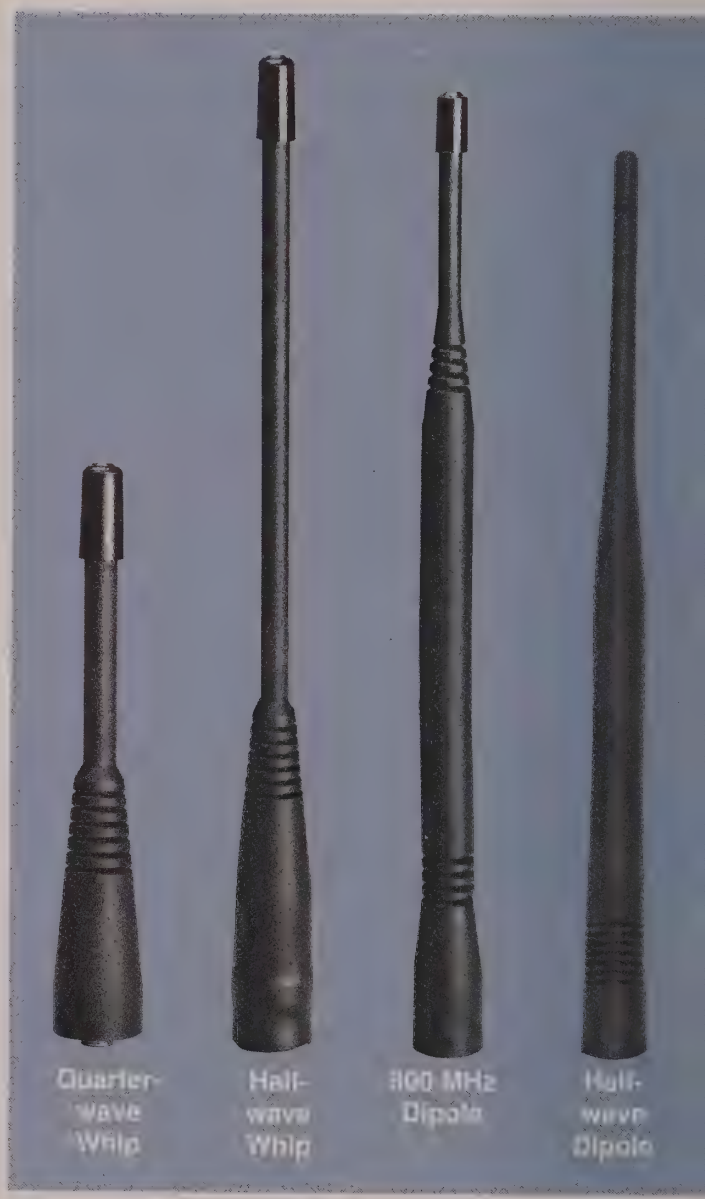
Ordering Information

If you require something other than the standard configuration listed, we will work with you to design an antenna to suit your special requirements. Contact our Customer Service Department for information.

800 MHz DIPOLE FREQUENCY	CONNECTOR	MODEL NO.
806-866 Trunking	SMA-female	G806S
	BNC-male	G806B
821-896 Cellular	SMA-female	G821S
	BNC-male	G821B
	TNC-male	G821T
800-960 Cellular	Right Angle TNC-male	G821R

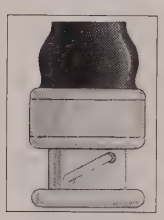
HALF-WAVE WHIP FREQUENCY	CONNECTOR	MODEL NO.
806-866 Trunking	SMA-female	F806S
821-896 Cellular	SMA-female	F821S
	BNC-male	F821B
	TNC-male	F821T

QUARTER-WAVE WHIP FREQUENCY	CONNECTOR	MODEL NO.
806-866 Trunking	SMA-female	E806S
	TNC-male	E806T
821-896 Cellular	SMA-female	E821S
	TNC-male	E821T

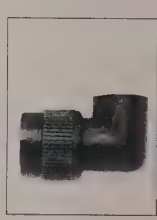


Connectors

SMA


BNC

TNC


RIGHT ANGLE

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Transit Antennas

148-174 / 406-512 / 806-890 MHz

PD1061 **Heavy Duty VHF** 148-174 MHz
PD1073 **Heavy Duty UHF** 406-512 MHz
A44008 **Heavy Duty 800** 806-890 MHz

Constructed to withstand exposure to environmental extremes, these heavy duty transit antennas are the choice for vehicles engaged in public safety, construction or transportation. The PD1061 and 1073 models are folded quarter wavelength sections of 6061-T6 aluminum tube enclosed by a high impact plastic radome. The patented A44008 model features a printed circuit board for maximum stability.

- **ABS radome** — Protects against hostile environments.
- **Stainless steel hardware** — Protects against corrosion.
- **Printed Circuit** — Maximizes stability.

Ordering Information

Item Number	Frequency Range - MHz	Connector
PD1061	148-174*	UHF female
PD1073	406-512*	Right Angle BNC female
A44008	806-890	BNC female

***Specify exact frequency.**

ELECTRICAL SPECIFICATIONS	PD1061	PD1073	A44008
Frequency Range - MHz	148-174	406-512	806-890
Gain	Unity	Unity	Unity
Maximum Power - Watts	100	100	100
VSWR	2:1	2:1 Max.	Less than 1.5:1
Nominal Impedance - Ohms	50	50	50
Radiation Pattern	Omni-directional (Roof Mounted)	Omni-directional (Roof Mounted)	Omni-directional (Roof Mounted)
Polarization	Vertical	Vertical	Vertical
Bandwidth	3 MHz	16 MHz	Over 90 MHz Under 2:1

MECHANICAL SPECIFICATIONS	PD1061	PD1073	A44008
Radiator Material	High Impact Plastic	High Impact Plastic	High Impact ABS
Connector	UHF female	Right Angle BNC female	BNC female, No Cable
Height - in. (mm)	4 (101.6)	3-1/2 (88.9)	3 (76.2)
Length - in. (mm)	21 (533.4)	10-1/2 (266.7)	7-3/4 (196.8)
Width - in. (mm)	3 (76.2)	2-3/4 (69.8)	3-3/8 (85.7)

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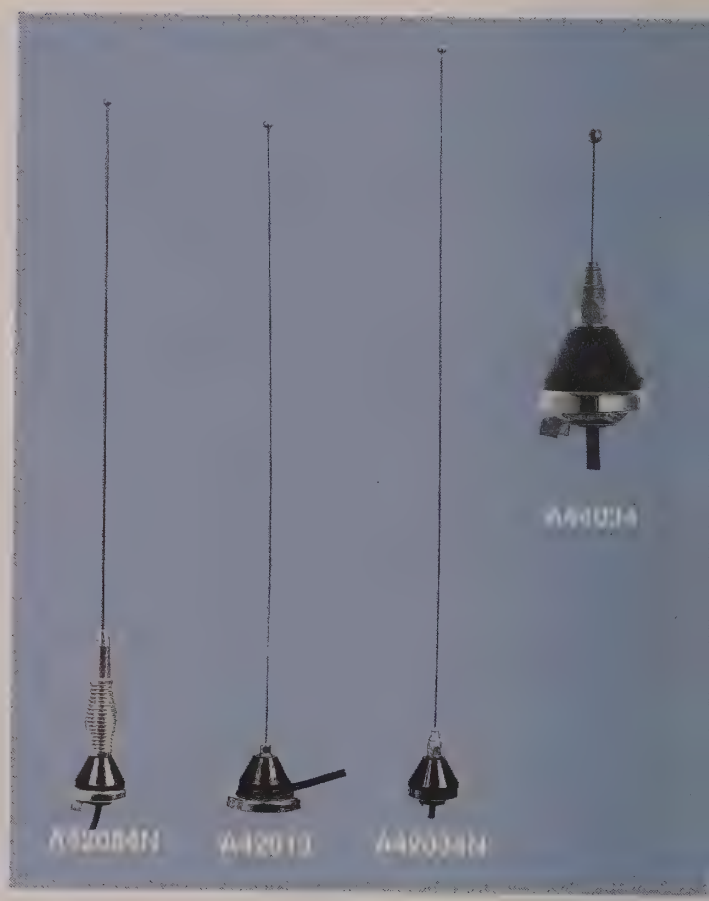
Quarter-wave Antennas

136-512 / 806-960 MHz

A42034N	**Low Profile**	136-512 MHz
A44034	**Low Profile**	806-960 MHz
A42013	**Low Profile**	136-512 MHz
A42054N	**Wide Band**	136-512 MHz

These quarter-wave antennas include three low profile units with eye-pleasing conical insulators, and a durable wide band antenna that is ideal for synthesized radios. Model A42034N has a two-set screw whip adapter for easy field tuning. Model A44034 is particularly suitable for urban areas where low gain is adequate. Model A42013 features a powerful mini-magnet for temporary applications. Model A42054N offers wide bandwidth for multi-frequency synthesized radios.

- **Conical insulators** — Protection, aesthetic value.
- **Multiple mounting options** — Satisfies customer requirements.



Ordering Information

Item No.	Frequency Range - MHz	Mount
A42034N	136-512	3/4" (19 mm) Hole, Motorla Style
A42054N	136-512	3/4" (19 mm) Hole, Motorla Style
A42013	136-512	Mini-Magnet
A44034	806-960	3/4" (19 mm) Hole, Motorla Style

ELECTRICAL SPECIFICATIONS	A42034N	A42013	A44034	A42054N
Frequency Range - MHz	136-512	136-512	806-960	136-512
Gain	Unity	Unity	Unity	Unity
Maximum Power - Watts	100	100	100	150
VSWR	Less than 1.5:1	Less than 1.5:1	Less than 1.5:1	Less than 1.75:1, Under 1.2:1 @ Center Frequency
Nominal Impedance - Ohms	50	50	50	50
Radiation Pattern	Omni-directional	Omni-directional	Omni-directional	Omni-directional
Polarization	Vertical	Vertical	Vertical	Vertical
Bandwidth	9 MHz @ 136 MHz @ 1.5:1 22 MHz @ 174 MHz @ 1.5:1 100 MHz @ 512 MHz @ 1.5:1	9 MHz @ 136 MHz @ 1.5:1 22 MHz @ 174 MHz @ 1.5:1 100 MHz @ 512 MHz @ 1.5:1	100 MHz @ 1.5:1	24 MHz @ 136-174 MHz 100 MHz @ 512 MHz @ 1.5:1

MECHANICAL SPECIFICATIONS	A42034N	A42013	A44034	A42054N
Radiator Material	17-7PH Stainless Steel	17-7PH Stainless Steel	17-7PH Stainless Steel	17-7PH Stainless Steel
Cable	17' (5.2 m) RG-58/U	17' (5.2 m) RG-58/U	17' (5.2 m) Special High Efficiency, Low Loss Coaxial Cable	17' (5.2 m) RG-58/U
Connector	PL-259	PL-259	PL-259 (Teflon®)	PL-259
Whip Length - in. (mm)	20 (508.0) Maximum	20 (508.0) Maximum	2-1/2 (63.5)	16-3/4" (425.0) Maximum

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Base Load Antennas

30-50 MHz

A41234N	30-36 MHz
A41334N	36-42 MHz
A41434N	42-50 MHz

These base loaded 100 Watt antennas are made to withstand hard usage. They are shock resistant, waterproof, and feature a shunt-fed loading coil protected by an impact-resistant housing. Each includes spring, 49" (1244.6 mm) whip, 17' (5.2 m) RG-58/U coaxial cable and PL-259 connector.

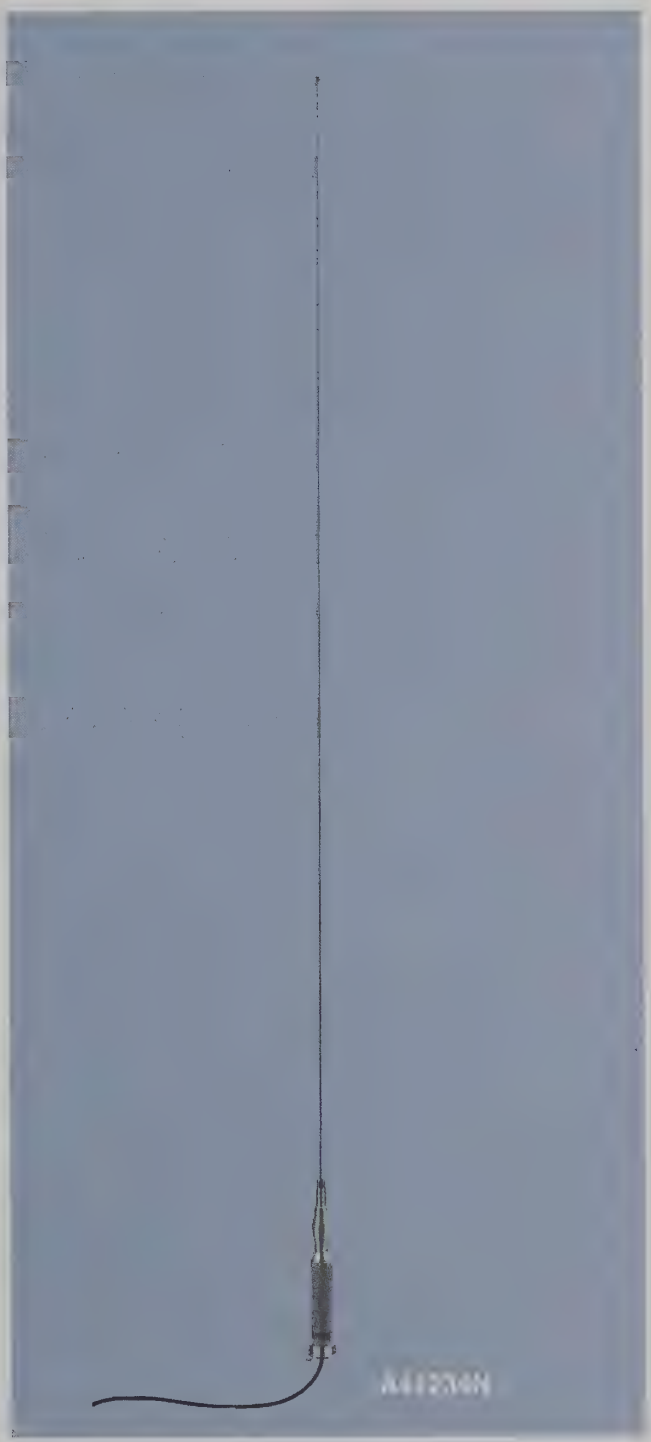
- **Stainless steel spring** — Added flexibility.
- **Shock resistant** — Assures performance.
- **Waterproof** — Ensures long trouble free service.

ELECTRICAL SPECIFICATIONS	A41234N	A41334N	A41434N
Frequency Range - MHz	30-36	36-42	42-50
Maximum Power - Watts	Over 100		
VSWR	Less than 1.5:1		
Nominal Impedance - Ohms	50		
Loading Coil	DC Grounded, Shock Resistant, Weatherproof, Shunt Feed, PVC Jacket, 1" (25.4 mm) dia., Length 4" (101.6 mm)		
Radiation Pattern	Omni-directional		
Polarization	Vertical		
Bandwidth	.4 MHz @ 30 MHz @ 1.5:1 Over 2 MHz @ 50 MHz @ 1.5:1		

MECHANICAL SPECIFICATIONS	A41234N	A41334N	A41434N
Radiator Material	17-7PH Stainless Steel		
Spring Material	Stainless Steel		
Cable	17' (5.2 m) RG-58/U		
Connector	PL-259		
Whip Length - in. (mm)	49 (1244.6) Maximum		

Ordering Information

Item No.	Frequency Range - MHz	Mount
A41234N	30-36	3/4" (19 mm) Hole, Motorla Style
A41334N	36-42	3/4" (19 mm) Hole, Motorla Style
A41434N	42-50	3/4" (19 mm) Hole, Motorla Style



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3 dB Gain Antennas

130-174 MHz

A42134N **Base Load Style**
A42234N **Coil-in-Mount Style**

These sturdy base loaded antennas, with 100 Watt power ratings, are complete with 49" (1244.6 mm) whip, 17' (5.2 m) RG-58/U coaxial cable and PL-259 connector. Model A42134N's shunt fed loading coil is encased in a shock-and-impact-resistant housing. Model A42234N has a low profile, low loss, waterproof coil and stainless steel shock spring.

- **Stainless steel whip** — Ensures long corrosion free service.
- **Multiple mounting options** — Satisfies any customer requirement.
- **Shock resistant, waterproof** — Assures performance.

ELECTRICAL SPECIFICATIONS	A42134N	A42234N
Frequency Range - MHz	130-174	138-174
Gain - dB	3	3
Maximum Power - Watts	Over 100	100
VSWR	Less than 1.5:1	Less than 1.5:1
Nominal Impedance - Ohms	50	50
Loading Coil	DC Grounded, Shock Resistant, Weatherproof, Shunt Feed, PVC Jacket	Low Loss Coil Waterproof Jacket
Radiation Pattern	Omni-directional	Omni-directional
Polarization	Vertical	Vertical
Bandwidth	4.5 MHz @ 1.5:1	4.5 MHz @ 1.5:1

MECHANICAL SPECIFICATIONS	A42134N	A42234N
Radiator Material	17-7PH Stainless Steel	17-7PH Stainless Steel
Spring Material	Stainless Steel	Stainless Steel
Cable	17' (5.2 m) RG-58/U	17' (5.2 m) RG-58/U
Connector	PL-259	PL-259
Whip Length - in. (mm)	49 (1244.6)	49 (1244.6) Max.

Ordering Information

Item Number	Frequency Range - MHz	Mount
A42134N	130-174	3/4" (19 mm) Hole, Motorola Style
A42234N	138-174	3/4" (19 mm) Hole, Motorola Style

CELWAVE RFS
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5 dB Gain Antenna

450-470 MHz

A43434N Phased Collinear Style

This sturdily constructed 100 Watt antenna is noted for excellent performance. The combination of heavy duty stainless steel shock spring and whip resists bending at high speeds, and sliding sleeve design imparts maximum mechanical strength. Tuning requires no whip cutting. Unit includes spring, whip with slideable phasing section assembled, 17' (5.2 m) RG-58/U coaxial cable and PL-259 connector.

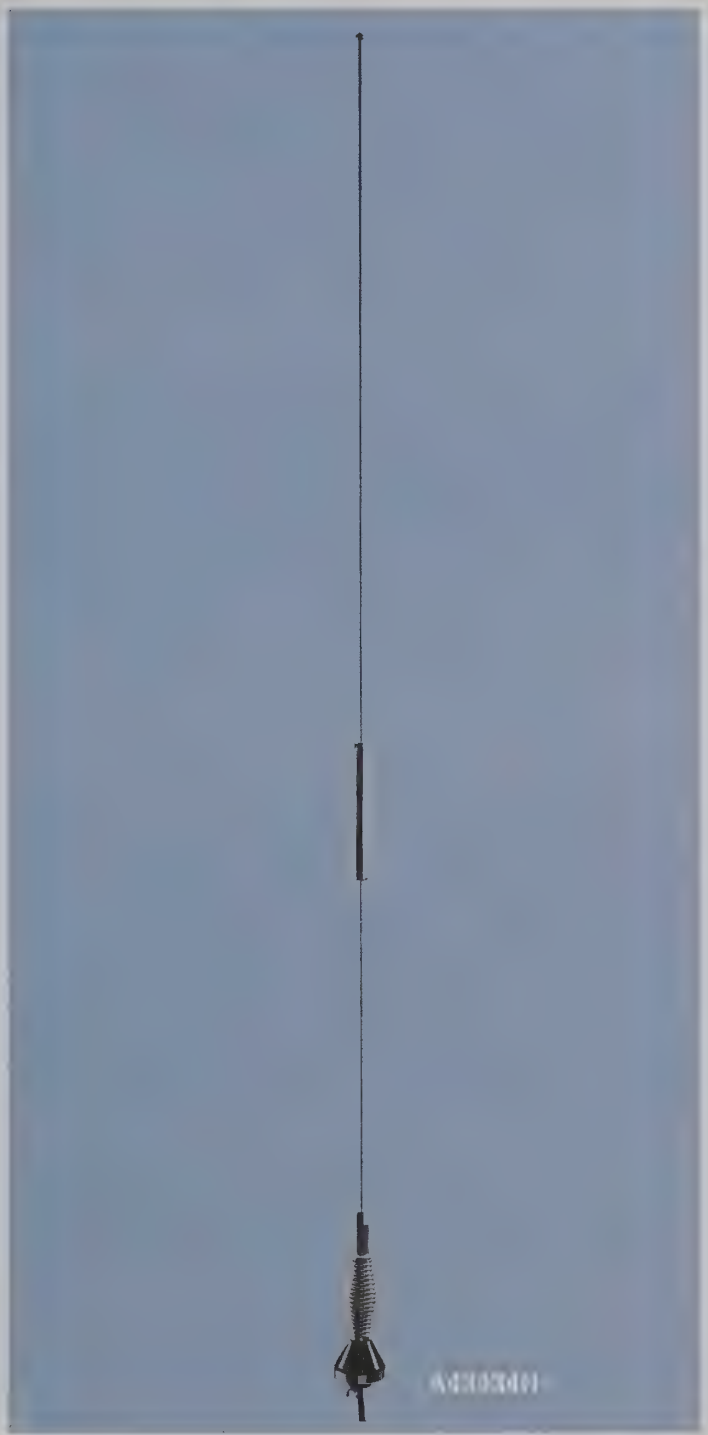
- **Stainless steel shock spring, whip** — Resists bending and corrosion.
- **Sliding sleeve** — Optimum mechanical strength.
- **Easy tuning** — Requires no whip cutting.

ELECTRICAL SPECIFICATIONS	A43434N
Frequency Range - MHz	450-470
Gain - dB	5
Maximum Power - Watts	100
VSWR	Less than 1.5:1
Radiation Pattern	Omni-directional
Polarization	Vertical
Bandwidth	Over 11 MHz @ 1.5:1

MECHANICAL SPECIFICATIONS	A43434N
Radiator Material	17-7PH Stainless Steel
Spring Material	Stainless Steel
Cable	17' (5.2 m) RG-58/U
Connector	PL-259
Whip Length - in. (mm)	34 (863.6) Maximum

Ordering Information

Item Number	Frequency Range - MHz	Mount
A43434N	450-470	3/4" (19 mm) Hole, Motorola Style



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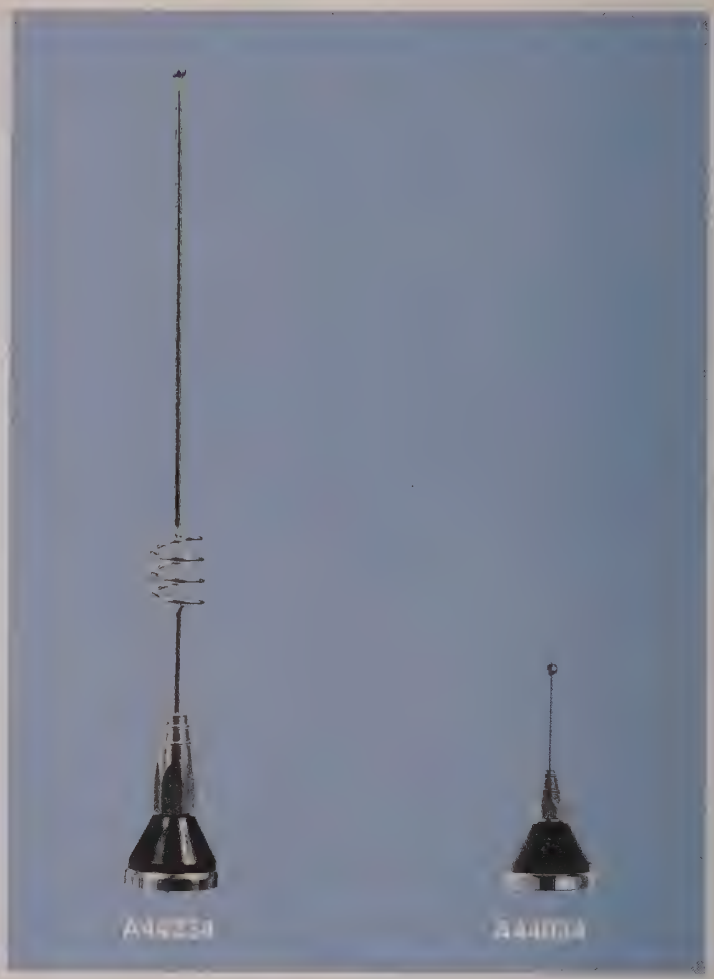
Peak Advantage™

806-960 MHz

A44234 3 dB Low Profile
A44034 Quarter Wave Low Profile

These low profile antennas combine superior omnidirectional performance with durability and eye appealing conical insulators. Both include removable, 17-7PH stainless steel whips, high power/low loss coaxial cable, Teflon® PL-259 connectors and have 100 Watt power ratings.

- **Omnidirectional** Maximizes system performance.
- **Conical insulator** Attractive appearance.
- **Stainless steel whip** Minimizes skin effect and heating.
- **Multiple mounting options** Satisfies customer requirements.
- **Removable whip** Car wash protection.



Ordering Information

Item Number	Frequency Range - MHz	Mount
A44234	806-960	3/4" (19 mm) Hole, Motorola Style
A44034	806-960	3/4" (19 mm) Hole, Motorola Style

ELECTRICAL SPECIFICATIONS	A44234	A44034
Frequency Range - MHz	806-960	806-960
Gain - dB	3	Unity
Maximum Power - Watts	100	100
VSWR	Less than 1.5:1	Less than 1.5:1
Nominal Impedance - Ohms	50	50
Radiation Pattern	Omnidirectional	Omnidirectional
Polarization	Vertical	Vertical
Bandwidth	60 MHz @ 1.5:1	100 MHz @ 1.5:1

MECHANICAL SPECIFICATIONS	A44234	A44034
Radiator Material	17-7PH Stainless Steel	17-7PH Stainless Steel
Cable - ft. (m)	17 (5.2) Special High Efficiency, Low Loss Coaxial Cable	17 (5.2) Special High Efficiency, Low Loss Coaxial Cable
Connector	PL-259 (Teflon®)	PL-259 (Teflon®)
Whip Length - in. (mm)	11 (279.4)	2.5 (63.5)

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Elevated Advantage™

824-896 MHz

PD10210

This elevated feed antenna provides the true, omnidirectional performance of a roof mount antenna when mounted to extend above the car's roofline. It is equipped with a tilt mount adjustable up to 30° for vertical installation on sloping trunk lids. A simple, quick release feature allows the antenna to be stored in the trunk when the car is parked or going through a car wash.

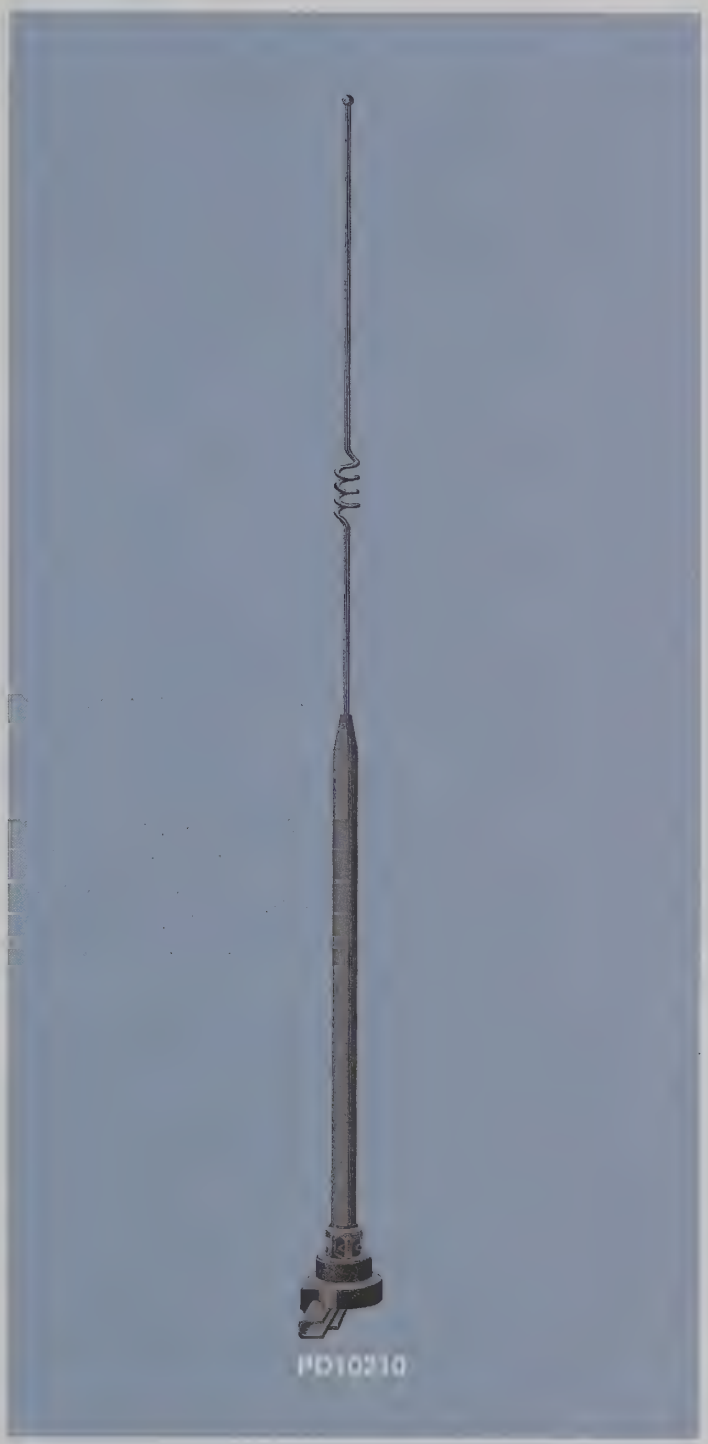
- **Superior performance** — True, omnidirectional transmission and reception.
- **Eliminates roofline interference** — Minimizes dropped calls.
- **Easy dismount** — Minimizes risk of theft or damage.
- **Adjustable tilt mount** — Allows vertical installation on sloping trunks.

ELECTRICAL SPECIFICATIONS	PD10210
Frequency Range - MHz	824-896
Gain - dB	3
Bandwidth - MHz	72
Power - Watts	10
VSWR	1.9:1
Impedance - Ohms	50

MECHANICAL SPECIFICATIONS	PD10210
Radiator Material	Stainless Steel
Cable - ft. (m)	15.5 (4.72) RG-58/U
Antenna Length - in. (mm)	28 (711.2)

Ordering Information

Model No.	Frequency Range - MHz	Connector
PD10210-T	824-896	TNC
PD10210-M	824-896	Mini UHF



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Glass Advantage®

806-960 MHz

PD821

Unlike conventional mobile cellular antennas, our Glass Advantage® uses advanced technology to couple through the glass of a vehicle and eliminates the need for a hole to be drilled in the vehicle's surface.

The Glass Advantage® transmits the signal through the windshield or back window and does not require the typical "ground plane" of its mobile cellular predecessors.

This premium performance, Euro-black finished antenna does not require the use of messy silicones or adhesives. Its advanced mounting technique allows installation in less than 10 minutes. Each antenna includes whip and base assembly, coupler box, cable assembly, window cleaner packet and four cable clips: mini UHF, or TNC male connector.

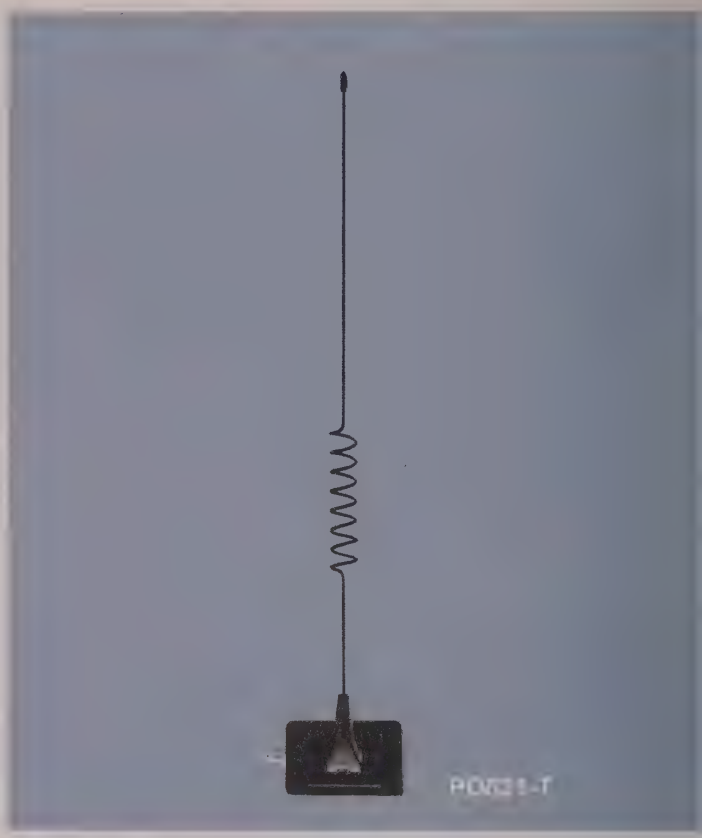
- **Premium performance** — Less hand-offs, fewer dropped calls, clearer reception and transmission.
- **Waterproof** — Base won't trap water.
- **No messy glues** — Coupler base attaches instantly and permanently.
- **No holes bored** — Eliminates damage to car body surfaces.

ELECTRICAL SPECIFICATIONS	PD821
Frequency Range - MHz	806-960
Maximum Power - *Watts	50
Gain - dB	3
Nominal Impedance - Ohms	50
Radiation Pattern	Omni-Directional
Polarization	Vertical
Maximum VSWR	Less than 2:1

MECHANICAL SPECIFICATIONS	PD821
Radiator Material	Premium Stainless Steel
Cable - ft. (m)	15.5 (4.72) RG-58/U
Whip Length - in. (mm)	12.5 (318)
Shipping Mode	UPS

***Safety note:** This product was designed for use with radios of 15 Watts or less transmitter power. Exceeding this limit may potentially cause hazardous levels of in-vechicle radiation.

U.S. PATENT #4,882,592



Ordering Information

Item Number	Frequency Range	Connector
PD821-T	806-896 MHz	TNC
PD821-M	806-896 MHz	Mini UHF
PD900-M	870-960 MHz	Mini UHF
PD900-T	870-960 MHz	TNC

Replacement Parts Available:

DESCRIPTION	806-896 MHz ITEM NO.	870-960 MHz ITEM NO.
Re-installation Kit: Includes — Cable Clips (4), Adhesive Tape, Window Cleaner, Instruction Sheet.	42403	42403
Cable Assembly	42020	42020
Base Assembly Only	42055	42055
Whip Assembly Only	42022	43095
Base and Whip Assembly	42201	43096
Coupler Box	42008	428850
TNC Male Connector	14A0067	14A0067
Mini UHF Connector	14A0014002	14A0014002
N-Male Connector	032119900	032119900
Teflon PL-259 Connector	19A0130002	19A0130002

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Cellular Advantage™

Tri-Band

PD10207 AM/FM/Cellular Antenna

"The high performance car phone antenna that doesn't look like one."

This new tri-band antenna is a direct replacement for factory installed AM/FM antennas. No extra holes to be drilled. No other antenna outperforms it for bringing in radio programs and phone conversations loud and clear. No other antenna gives better protection against dropped calls.

Motorized, the Cellular Advantage automatically extends when the ignition is turned on. When the ignition is turned off, or the supplied overide switch is thrown, the antenna retracts to hide in a fender or quarter panel for maximum protection against theft and vandalism.

- **High performance** True, omnidirectional transmission and reception.
- **Direct replacement** No additional holes required for installation.
- **Retractable** Minimizes risk of theft and vandalism.
- **AM/FM/Cellular** One antenna for all three functions.

ELECTRICAL SPECIFICATIONS	PD10207
Operating Frequency Band	
Cellular	824-896 MHz
FM	88-108 MHz
AM	520-1610 KHz
Gain - dB (Cellular)	3
Maximum Input Power - Watts	
Cellular	30
Operating Voltage - VDC	12
Current Drain - Amps	3
Impedance - Ohms	
Cellular	50
AM/FM	75
VSWR - Cellular	1.5:1

MECHANICAL SPECIFICATIONS	PD10207
Extended Length - in. (mm)	34 (863.6)
Under Fender Length - in. (mm)	15.5 (393.7)
Radiator Material	
Cellular Section	Black Fiberglass
AM/FM Sections	Black Chrome Plated Stainless Steel
Cable - in. (mm)	
Cellular	55 (1397) T5-50 Low Loss
AM/FM	18 (457.2) Coax
Switching	80 (2032) Wire
Power Supply	55 (1397) Wire
Connectors	
Cellular	TNC and Mini UHF supplied
AM/FM	Motorola-Type Plug
Mounting Bases	Are supplied to fit angles of most car fender installations

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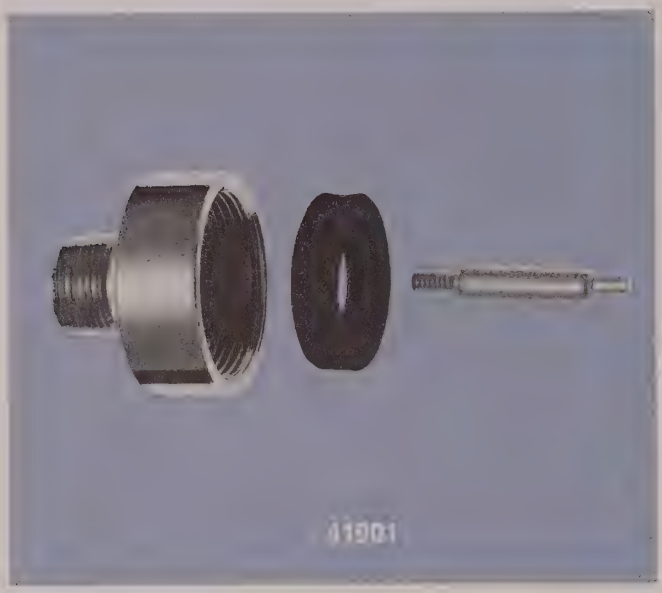
Accessories

Mounts With Adapter
Model 41901
Motorola adapter to mount base loaded coil on Motorola style mount.



Motorola Style 3/4" Hole Mount
Model 41918
Exact replacement Motorola 3/4" hole mount with 14' (4.2 m) RG-58A/U cable and PL-259 connector.

Thick Roof Mount
Model 41936
Motorola thick roof mount with 17' (5.2 m) RG-58/U cable and PL-259 connector 1-1/8"–14 thread.

Motorola Style Heavy Duty Magnet Mount
Model 41913
17' (5.2 m) RG-58/U cable and PL-259 connector, 1-1/8"–14 thread.

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Mayday!

The U.S. Coast Guard hears that call hundreds of times a day. It means a boat's in trouble out there. Finding it often means finding people in worse shape than the boat's in. People who are in urgent need of on-shore medical care.

Getting the news of that need to land-based emergency services used to involve a combination of ship-to-shore radio, telephone relays and telling the local EMS to tune in Marine Channel 16...if they had a radio handy that would receive Channel 16.

A broader band radio system now allows Coast Guard Search and Rescue teams to talk directly to ambulance services, hospitals, police and anyone else who should be standing by when the cutter or helicopter arrives.

The new system saves time, confusion and lives. Making it work required an antenna that would meet wider bandwidth specifications without degrading existing VHF communications. No such antennas existed.

So, Celwave made them.

Celwave has designed and equipped antenna systems to meet all kinds of needs, all over the world. Sometime soon, we could do the same for you.

CELWAVE RFS

DIVISION OF RADIO FREQUENCY SYSTEMS

Let's talk about your future.

©1990 Radio Frequency Systems, Inc.

The Way They're Built

Celwave's twenty year design life and strict quality standards produce rugged, environmentally sound, high performance base station antennas.

For longest life, the elements are encased in a protective radome of high quality dielectric material (such as fiberglass) with uniform heavy walls and a smooth exterior surface to provide mechanical support, rigidity and protection from the environment, especially radial ice buildups. Celwave manufactures radomes "in-house" to guarantee proper strength and moisture seal. The fiberglass cloth carries a pigment to retard ultraviolet deterioration assuring a long useful life.

To minimize the intermodulation possibilities, Celwave welds or solders connections wherever possible. Freedom from dissimilar metal contacts is also essential to prevent non-linear joints which can generate I.M. signals. When non-soldered joints are necessary, special care is taken to use compatible materials. In addition, screw type joints are used to ensure maximum contact pressure.

Downtilt

By tilting the entire vertical pattern downward, nulls are brought closer to an antenna site – often close enough to totally eliminate their effect on a coverage area.

Downtilt can be accomplished electrically or mechanically. Mechanical downtilt is achieved by physically tilting the antenna and pointing the beam in the direction of the tilt. With multiple antenna systems, mechanical tilting allows each antenna to serve a distinct direction.

Electrical tilt is achieved by phasing the elements of an array and aiming them downward at the same angle in all horizontal directions. In antennas where the array is individually fed, phasing is accomplished by varying feed line length so that radiating elements are not fed in phase. This method also applies to antennas in which groups of elements are fed separately, such as a panel antenna, or any antenna in which all elements are not fed by a single line. In vertically polarized, single feed point collinear dipole antennas, beam tilt is accomplished by spacing elements to be fed out of phase. Though electrical beam tilt results in a slight, peak gain loss, this loss can be compensated for by adding elements to the array.

A combination of electrical and mechanical tilting is extremely useful when limited coverage is required in one area or when the area is composed of widely divergent elevations. The technique increases signal strength in a desired area without increasing interference to neighboring systems.

Beam tilt can be used to do more than make efficient use of antenna radiating power. In a cellular application, where a cell is experiencing reception problems, a higher gain antenna with beam tilt and null fill can eliminate the problems and save the hundreds of thousands of dollars it would cost to split the cell into two smaller cells in order to increase field strength.

As part of a specialized SMR system or 900 MHz paging system, beam tilt can be used to saturate the local area while reducing the chances of interference with neighboring systems.

When antenna heights well above 1,000 feet are encountered, such as in mountain-top locations, a down-tilt antenna should be considered to alleviate the possibility of overshoot. For example, a 10 dBd gain, 6 degree down-tilt antenna has proven to be successful when faced with mountain-top or other extremely high tower mounting applications.

Filling in the Nulls

A major objection to using high gain antennas has been the danger of overshooting a desired coverage area and creating nulls below the main vertical beam.

A technique called "null fill" can eliminate these dead spots and is generally accomplished by lowering the peak gain of the antenna while feeding its elements with differing amplitudes.

Gain loss in such cases can be compensated for by adding elements and using unequal power dividers or varying the division of power from one element group to the other. Amplitude can also be varied by an increase or decrease of elements in a group.

Lightning Protection

When top mounting an antenna, care should be taken to insure adequate lightning protection. While it is almost impossible to ensure complete protection from a direct strike, damaging effects may be minimized by careful selection and proper installation to a tower ground system. Celwave offers several antennas which are specifically designed to operate in extreme weather conditions. They utilize heavy-duty construction throughout and internal feed systems are designed to provide a low resistance path to the ground. Only antennas that provide direct DC grounding should be used.

We also offer lightning arrestors and cable grounding straps that further minimize the risk of system damage from lightning strikes. See pages 167 and 169 for additional information.

PD1252 Pressurization Option

Many of Celwave's fiberglass radome type antennas can be supplied with special 28" support pipe, 7/8 inch E.I.A. flange termination and pressure seals to allow pressurization of the antenna to 12 PSIG. Antennas ordered with the PD1252 Pressurization Option may be invert mounted without further modification as long as pressure to the antenna is maintained. Antennas are shipped in unpressurized state.

PD1254 Invert Mount Option

Most Celwave fiberglass radome type antennas are available with the factory installed PD1254 Invert Mount Option, allowing the antennas to be mounted support pipe up, without detrimental moisture incursion. Antennas without this option should NEVER be mounted upside down.

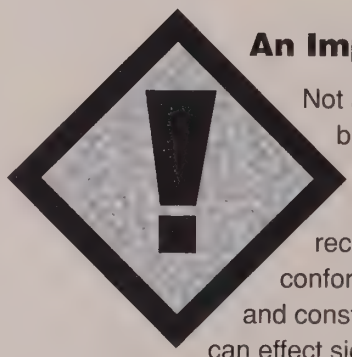
Sidemounting of Antennas

When sidemounted, the minimum distance that the antenna should be located away from the mounting structure is a quarter wavelength. Most installations warrant greater mounting distances due to pattern shape requirements. The horizontal radiation pattern associated with a quarter wavelength spacing is a heart shaped pattern with a notch behind the antenna resulting from interactions with metallic members within the antennas' near field. Inherently, the larger the tower cross-section area, the greater the depth of the pattern nulls; the farther the antenna is mounted away from the

tower, the greater the number of nulls but the depths will be less severe.

At most site locations, omnidirectional pattern characteristics will be required even though sidemounting of antennas may be mandatory. Omnidirectional characteristics can be approached by mounting a single antenna numerous wavelengths away from the mounting structure. Alternate configurations incorporate the use of multiple, unidirectional, phased antenna arrays, consisting of at least two antennas. Phasing of two omnidirectional antennas mounted 180 degrees opposed is to be avoided due to the occurrence of deep nulls caused by excessive pattern interaction.

The principle advantage of phasing multiple directive antennas is to generate pseudo omnidirectional patterns in applications where very large structures are involved. They provide performance above and beyond what would be realized by sidemounting omnidirectional antennas large distances from the same size structures. Very good omnidirectionality can be obtained by arraying selected unidirectional antennas around the structure. Selection of the antennas depends upon size and shape of the structure and upon the gain required from the total array. Our sales engineering staff will discuss your pattern requirements and specific applications.



An Important Note

Not all applications are broadband. Narrow band antennas for transmit only and receive only use, which conform to Celwave's design and construction philosophy, can effect significant economy. A narrower bandwidth may also reduce unwanted signal reception. Our sales engineering staff is available to discuss your specific pattern requirements and applications.

Monopole Antennas

25-512 MHz

PD128	**Unity Gain Omnidirectional**
PD206	**3.0 dBd Cardioid**
PD207	**3.0 dBd VHF Cardioid**

These antennas feature a grounded radiator to provide optimum protection from proximity lightning strikes and reduce static noise. Their durable design makes them ideal for most high and low band applications.

Monopole antennas are supplied complete with mounting hardware and may be factory tuned to your exact frequency requirements or provided as field tunable (FT models).

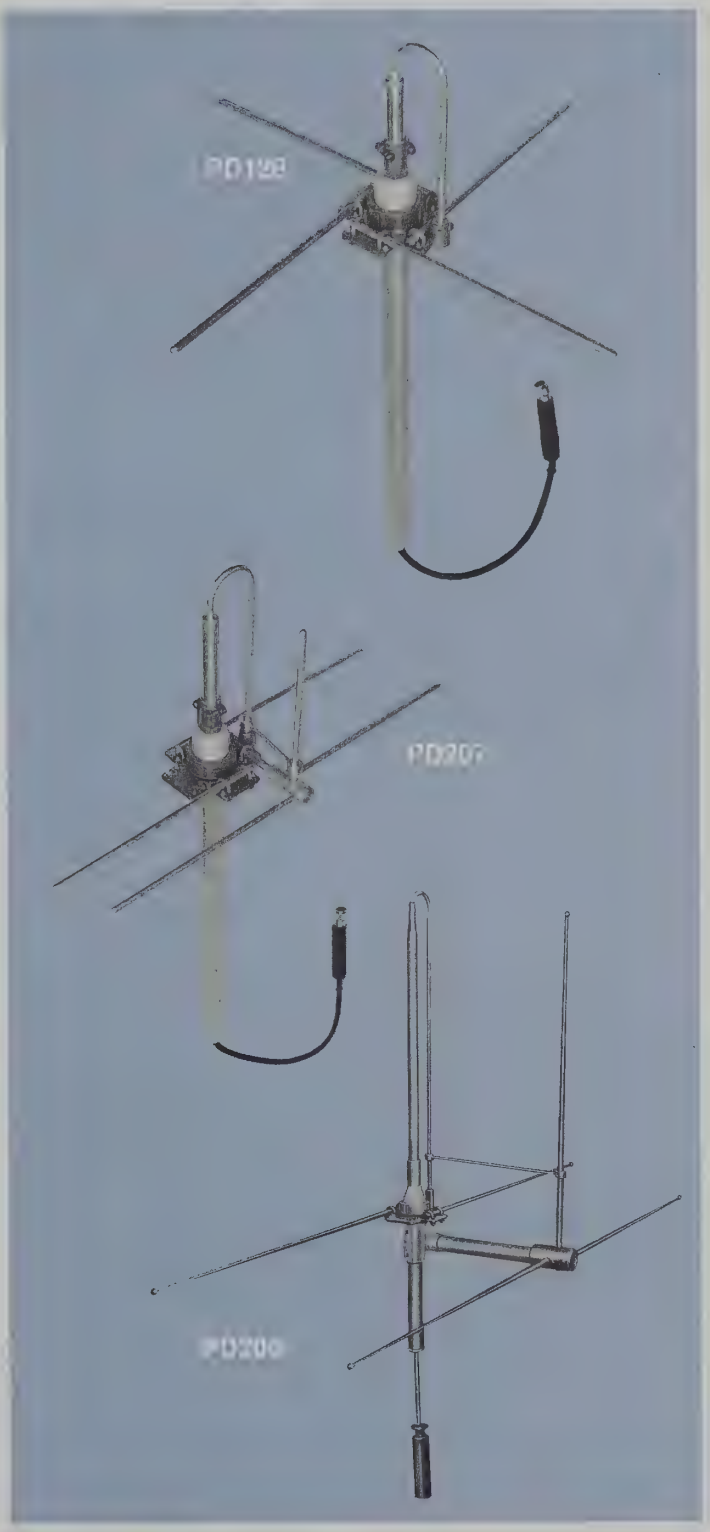
The omnidirectional PD128 has a folded radiating element and is intended for service in installations requiring a directly grounded structure. The element extends above the ground plane 9 ft. (2.74 m) at 30 MHz and 3.7 ft. (1.1 m) at 150 MHz.

The PD128-2FT may be precision field tuned using a hand saw and a tape ruler within its 30-54 MHz frequency range. Easy to follow instructions and cutting charts are supplied. It is an excellent emergency antenna. When stored on site it can be immediately tuned and installed, eliminating costly downtime.

PD206 Cardioid Antenna, with the addition of a driven director, produces 3.0 dBd forward gain and 20.0 dBd front-to-back ratio. Both director and radials are made of high strength aluminum. This antenna will show a DC open circuit between the inner conductor of the flexible extension and the radiating element.

PD207 Cardioid Antenna is a high band version of PD206. Both antennas make use of a driven director to obtain their gain and directivity. Thus they are capable of more consistent performance than if they were based on parasitic principles alone.

• **6061-T6 Aluminum construction**	For high strength, lower weight and corrosion resistance.
• **Direct ground**	Provides system protection against lightning strikes.
• **Tunable option (P128-2FT)**	Allows precise tuning in the field.



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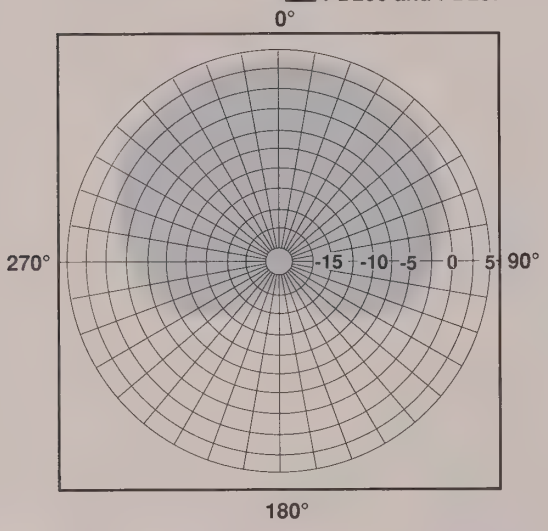
Monopole Antennas

Ordering Information

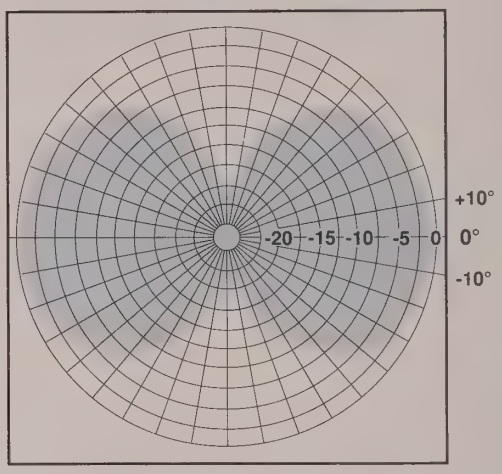
Item Number Standard	Item Number Field Tunable	Frequency Range-MHz	Item Number Standard	Frequency Range-MHz
PD128-1	PD128-1FT	25-29	PD206-1	25-30
PD128-2	PD128-2FT	30-39.5	PD206-2	31-40
PD128-2A	PD128-2AFT	39.75-54	PD206-2A	41-54
PD128-3	PD128-3FT	66-88	PD206-3	66-88
PD128-4	PD128-4FT	108-176	PD207	150-174*
PD128-5	PD128-5FT	406-512		

***Exact frequencies must be specified.**

HORIZONTAL PATTERN
(Cardioid) ☐ PD206 and PD207



VERTICAL PATTERN ☐ PD128



ELECTRICAL SPECIFICATIONS	PD128	PD206	PD207
Frequency Range - MHz	25-512	25-88	150-174
Gain - dBd	Unity	3	3
Bandwidth - MHz for 1.5:1 VSWR	0.6 @ 30 MHz 3.0 @ 150 MHz 8.0 @ 500 MHz	0.4 @ 30 MHz 1.0 @ 66 MHz	3.0 @ 150 MHz
Vertical Beamwidth 1/2 Power Point	76°	76°	76°
Maximum Power Input - Watts	500	500	500
Front-to-Back Ratio - dBd	N/A	20	20
Lightning Protection	Direct Ground	Direct Ground	Direct Ground
Termination - Direct Flexible	18 in. (457 mm) RG8A/U Flexible Cable with N-male Connector Attached		

Note: All VSWR data referenced to 50 Ohms.

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Monopole Antennas

MECHANICAL SPECIFICATIONS	PD128	PD206	PD207
Overall Length - ft. (m)	9.75 (2.92) @ 30 MHz 3.71 (1.13) @ 150 MHz 2.67 (.813) @ 450 MHz	9.75 (2.92) @ 30 MHz 5.58 (1.70) @ 66 MHz	3.71 (1.13) @ 150 MHz
Support Pipe Diameter - in. (mm)	1-5/16 (33)	1-5/16 (33)	1-5/16 (33)
Mounting Length - in. (mm)	24 (610)	20 (508)	24 (610)
Weight - lbs. (kg)	13 (5.9) @ 30 MHz 7 (3.2) @ 150 MHz 5 (2.3) @ 450 MHz	20 (9.1) @ 30 MHz	10 (4.5) @ 150 MHz
Radiating Element Material	6061-T6 Alum. Rod and Pipe	6061-T6 Alum. Rod and Pipe	6061-T6 Alum. Rod and Pipe
Ground Plane Material	6061-T6 Aluminum Rod	6061-T6 Aluminum Rod	6061-T6 Aluminum Rod
Director Material	6061-T6 Aluminum Rod	6061-T6 Aluminum Rod	6061-T6 Aluminum Rod
Support Pipe Material	6061-T6 Aluminum Pipe	6061-T6 Aluminum Pipe	6061-T6 Aluminum Pipe
Rated Wind Velocity - mph (km/hr)	100 (161) @ 30 MHz 125 (201) @ 150 MHz 150 (242) @ 450 MHz	100 (161) @ 30 MHz	125 (201)@ 150 MHz
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	1.0 (.93) @ 30 MHz 0.16 (.015) @ 150 MHz 0.06 (.006) @ 450 MHz	1.5 (.139) @ 30 MHz	0.19 (.018) @ 150 MHz
Lateral Thrust @ 100 mph - lbs. (kg)	40 (18.2) @ 30 MHz 6.4 (2.9) @ 150 MHz 1.3 (0.2) @ 450 MHz	60 (27.3) @ 30 MHz 25 (11.4) @ 66 MHz	7.6 (3.5) @ 150 MHz
Bending Moment 1 in. (25mm) Below Ground Plane @ Rated Wind - ft./lbs. (m/kg)	90 (12.4) @ 30 MHz 6.4 (0.9) @ 150 MHz 1.3 (0.2) @ 450 MHz	100 (13.8) @ 30 MHz 30 (4.1) @ 66 MHz	7.7 (1.1) @ 150 MHz
Mounting Hardware - Supplied	PD46 Clamp Set (All Models)	PD46 Clamp Set (All Models)	PD46 Clamp Set (All Models)
Mounting Hardware - Optional	PD246 Pole Mount, PD502 Side Mount (Short), PD504 Side Mount (Long)		
Shipping Weight - lbs. (kg)	36 (16) @ 30 MHz	38 (17) @ 30 MHz	14 (6.4) @ 150 MHz
Shipping Volume - ft.^{3} (m^3)	3.25 (.09) @ 30 MHz	3.3 (.09) @ 30 MHz	1.1 (.03) @ 150 MHz
Shipping Mode	30-45 MHz - Common Carrier, 45-450 MHz - UPS		UPS

Side Mount Antennas

30-88 MHz

PD320	**2.5 dBd Offset-Gain**
PD322	**2.5 Omni (5.0 dBd Offset)**
PD324	**5.0 dBd Omni (7.5 Offset)**

This is a series of side mounted antennas designed for applications requiring the utilization of available space on the sides of towers. Each antenna is supplied cut to the desired operating frequency and assembled ready for installation.

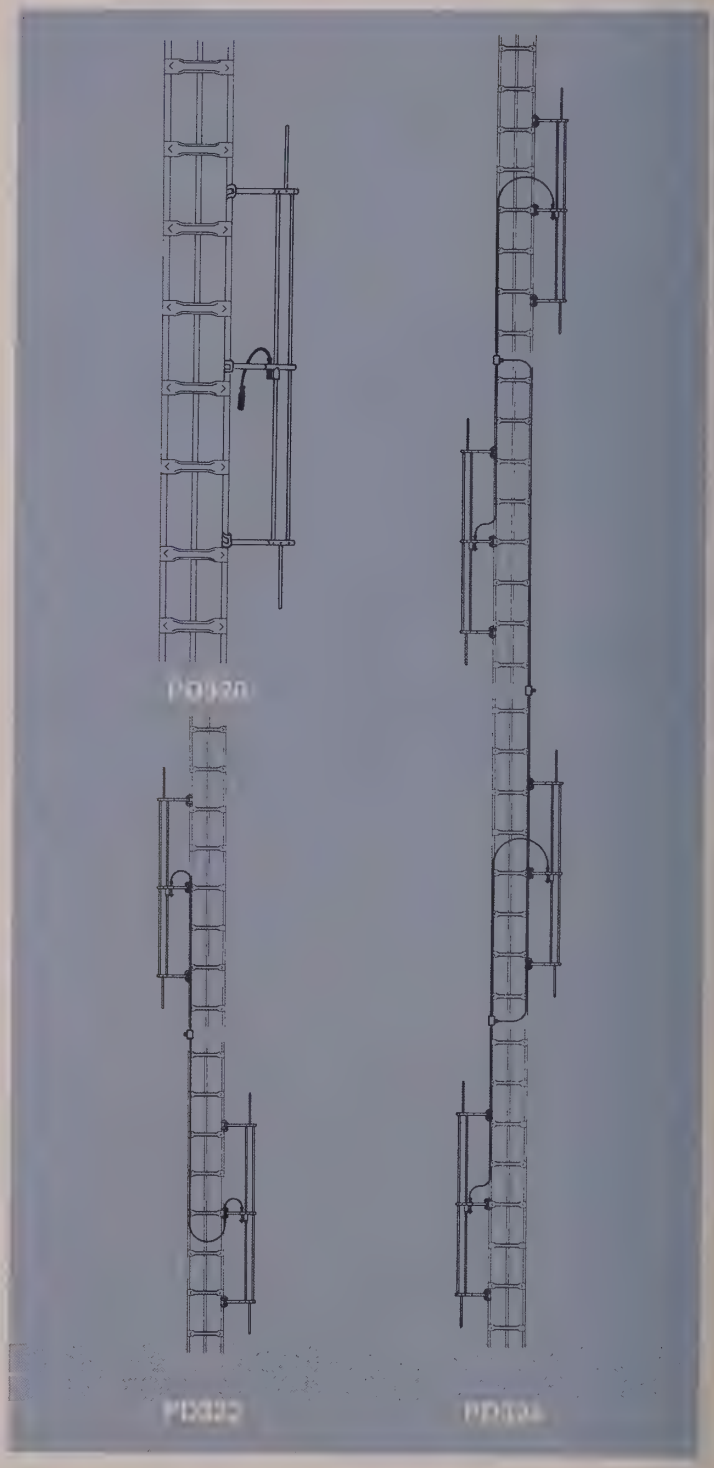
The single element side mounted PD320 provides an offset pattern with approximately 2.5 dBd gain in the forward direction. High strength aluminum alloy is used for all antenna parts, except the stainless steel mounting clamps.

The PD322, a 2.5 dBd Omni/5.0 dBd Offset Gain Antenna consists of two PD320 antenna elements and a matching harness. When mounted with its two elements on opposite sides of a small tower and spaced 3/4 wavelengths apart vertically, it produces an essentially circular pattern with approximately 2.5 dBd gain. The PD322 may also be mounted with both elements on one side of the tower in which case it will provide an offset pattern with approximately 5.0 dBd gain in the maximum direction.

The PD324, a 5.0 dBd Omni/7.5 Offset Gain Antenna consists of four PD320 antenna elements and a matching harness. This antenna, when mounted with its elements staggered around the tower and spaced 3/4 wavelengths apart vertically, has essentially a circular pattern with approximately 5.0 dBd gain. The antenna may also be mounted with all elements on one side of the tower, in which case it will produce an offset pattern with approximately 7.5 dBd gain in the maximum direction.

Note: 1-1/2" is the maximum tower leg size to which antenna can be mounted without affecting performance.

• **Field adjustable**	Optimizes VSWR on different tower structures.
• **Side mount design**	Makes low band operation possible when top mounting is not desirable.



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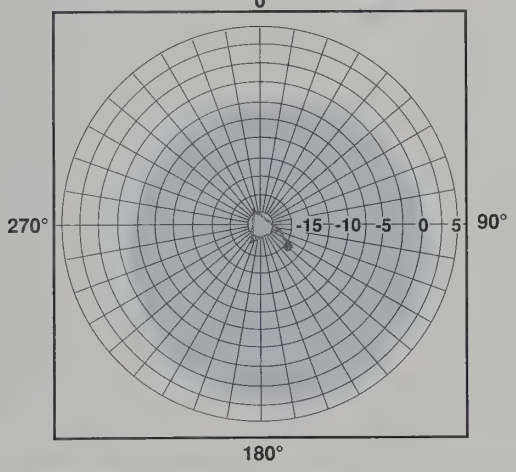
Side Mount Antennas

ELECTRICAL SPECIFICATIONS	PD320	PD322	PD324
Frequency Range - MHz	30-54 66-88	30-54 66-88	30-54 66-88
Gain - dBd	2.5 (Offset)	2.5 (Omni), 5.0 (Offset)	5.0 (Omni), 7.5 (Offset)
Bandwidth - MHz for 1.5:1 VSWR @ 30 MHz @ 76 MHz	 0.6 1.0	 0.6 1.0	 0.6 1.0
Vertical Beamwidth 1/2 Power Points	Installation Dependent	Installation Dependent	Installation Dependent
Maximum Power Input - Watts	500	500	500
Lightning Protection	Direct Ground	Direct Ground	Direct Ground
Termination - Direct Fixed	N-male	N-male	N-male
Flexible Extension - Supplied w/PD320	124 in. (610 mm) RG8A/U Flexible Cable with N-male Connector Attached		

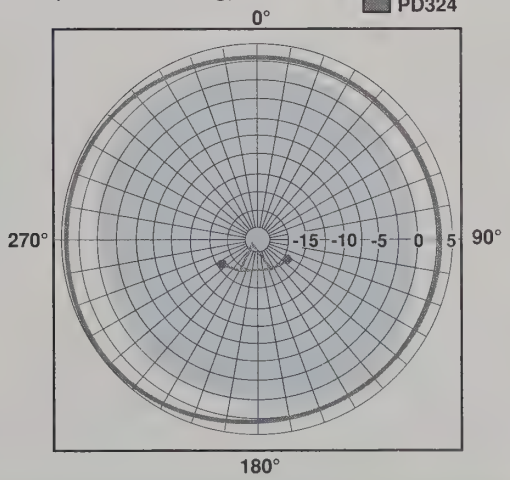
Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD320	PD322	PD324
Overall Length - ft. (m) @ 30 MHz @ 50 MHz @ 74 MHz	16.5 (5.03) 10 (3.05) 6 (1.83)	41 (12.5) 24 (7.32) 16 (4.88)	92 (28) 55 (16.8) 36 (11)
Spacing from Tower - in. (mm)	8 (203)	8 (203)	8 (203)
Weight - lbs. (kg)	15 (6.8)	32 (14.5)	66 (30)
Radiating Element Material	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Wind Loading Area Flat Plate Equivalent - ft.² (cm²)	1.13 (.105)	2.25 (.209)	4.50 (.418)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	45 (20.5) @ 30 MHz	90 (40.9) @ 30 MHz	180 (81.8) @ 30 MHz
Mounting Hardware - Supplied	Stainless Steel Mounting Clamps mounts antenna on round tower legs 1 in. (25 mm) to 1.5 (38 mm) in. diameter		
Shipping Weight - lbs. (kg)	22 (10) @ 30 MHz	44 (20) @ 30 MHz	88 (40) @ 30 MHz
Shipping Volume - ft.³ (cm³)	2.8 (0.08) @ 30MHz	5.5 (0.16) @ 30 MHz	11.1 (0.31) @ 30 MHz
Shipping Mode	30-54 MHz - Common Carrier; 55-88 MHz - UPS		

HORIZONTAL PATTERN PD320



HORIZONTAL PATTERN (Omni Mounting) PD322 PD324



Ordering Information

Item No.	Freq. Range - MHz	Item No.	Freq. Range - MHz	Item No.	Freq. Range - MHz
PD320-1	30-39	PD322-1	30-39	PD324-1	30-39
PD320-2	40-54	PD322-2	40-54	PD324-2	40-54
PD320-3	66-88	PD322-3	66-88	PD324-3	66-88

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Unity Gain Coaxial Antennas

25-175 MHz

PD83 **General Service**
PD114 **Lightweight**

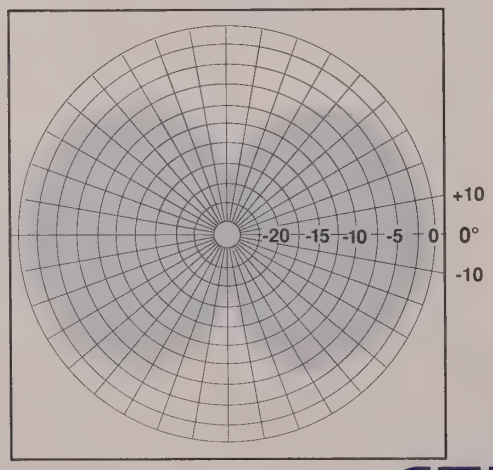
The PD83 is intended for use in fixed base station applications and is constructed of corrosion resistant materials to give long, trouble free service. The antenna is supplied standard with a 6061-T6 aluminum whip. A spring tempered 17-7PH stainless steel whip is available. *Specify PD83A.*

The PD114 is constructed principally of high strength corrosion resistant, 6061-T6 aluminum alloy. This antenna is ideally suited for use in portable field test work as well as in permanent base station operation. The overall length is similar to PD83. This antenna can be supplied with a 17-7 PH spring tempered stainless steel whip. *Specify PD114A.*

• **Coax design**	Provides broad vertical beam and good close in coverage.
• **Two piece construction**	Whip field replaceable.
• **6061-T6 Aluminum elements**	Welded solid rods for high strength, low weight and corrosion resistance.
• **Stainless steel whip option**	For the more hostile atmospheric environments.

VERTICAL PATTERN

☐ PD83 and PD114



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Unity Gain Coaxial Antennas

Ordering Information*

Item Number		Frequency Range - MHz
Standard	**SS Whip**	
PD83-1	PD83A-1	25-29.75
PD83-2	PD83A-2	30-39.75
PD83-3	PD83A-3	40-50
PD83-4	PD83A-4	70-76
PD83-5	PD83A-5	144-175
PD114-1	PD114A-1	25-30
PD114-2	PD114A-2	30-36
PD114-3	PD114A-3	36.25-42
PD114-4	PD114A-4	42.25-48
PD114-5	PD114A-5	48.25-50
PD114-6	PD114A-6	144-174
PD114-7	PD114A-7	66-88

***Specify exact frequency for bands not given.**

ELECTRICAL SPECIFICATIONS	PD83	PD114
Frequency Range - MHz	25-175	25-174
Gain - dBd	Unity	Unity
Bandwidth - MHz for 1.5:1 VSWR	0.5 @ 25 MHz	1.0 @ 30 MHz
Vertical Beamwidth 1/2 Power Points	75°	75°
Maximum Power Input - Watts	500	500
Lightning Protection	Star Gap	Star Gap
Termination - Direct Flexible	18 in. (457 mm) RG8A/U Flexible Cable with N-male Connector Attached	

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD83	PD114
Overall Length - ft. (m)		
@ 30 MHz	18.5 (5.64)	18.5 (5.64)
@ 150 MHz	5.8 (1.77)	5.8 (1.77)
Skirt Diameter - in. (mm)	2 (51)	1.5 (38)
Support Pipe Diameter - in. (mm)	1-5/16 (33)	1-1/16 (27)
Support Pipe Mounting Length - in. (mm)	24 (610)	24 (610)
Weight - lbs. (kg)		
@ 30 MHz	17 (7.7)	8 (3.6)
@ 150 MHz	12 (5.4)	3 (1.4)
Whip Material	6061-T6 Aluminum	
Skirt Material	Copper	6061-T6 Alum.
Support Pipe Material	6061-T6 Aluminum	
Wind Loading Area Flat Plate Equivalent - ft.² (m²)		
@ 30 MHz	1.0 (.093)	1.11 (.103)
@ 150 MHz	.525 (.049)	.33 (.031)
Rated Wind Velocity - mph (km/hr)		
@ 30 MHz	100 (161)	75 (121)
@ 150 MHz	125 (201)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)		
@ 30 MHz	40 (18.2)	25 (11.4) @ 75 mph
@ 150 MHz	21 (9.5)	13 (5.9)
Bending Moment 6 in. (152 mm) Below Skirt @ 100 mph - ft../lbs. (m/kg)		
@ 30 MHz	225 (31.2)	148 (20.5) @ 75 mph
@ 150 MHz	15 (2.08)	14 (1.94)
Mounting Hardware - Supplied	PD46 Clamp Set	
Mounting Hardware - Optional	PD241 Wall Mount PD246 Pole Mount PD502 Side Mount (Short) PD504 Side Mount (Long)	
Shipping Weight - lbs. (kg)**	18-32 (8.2-15)	10-27 (4.5-12)
Shipping Volume - ft.³ (m³)	0.7-1.8 (.02-.05)	0.7-1.8 (.02-.05)
Shipping Mode**	25-149 MHz - Common Carrier 150-174 MHz - UPS	

**Depending on frequency.

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Fiberglass Omnidirectional Antennas

25-88 MHz

PD1142 **Narrow Frequency Band**
BA3010 **Broad Frequency Band**

The PD1142 is a narrow band unity gain antenna built to a specific spot frequency requirement to effectively reduce interference from other near frequency transmitters. Of rugged, two-piece construction, the antenna's lower section is enclosed in heavy-wall fiberglass tubing. The upper whip is fiberglass and attaches in the field with a protected 1/2" x 20 threaded connector. This unit provides the advantages of DC ground lightning protection, versatility, installation ease and requires no ground plane elements to decouple from the support structure.

The BA3010 unity gain antenna features 7 MHz bandwidth to facilitate duplexing, or combining of several transmitters into one antenna. The coaxial type construction makes it ideal for both base station and marine applications. It may be mounted directly on top of or adjacent to a support pipe top section. Support pipes can range from 1 1/2 inches to 2 1/8 inches (top mount) and 3/4 inch to 2 1/8 inches (adjacent mounting). Top mounting allows the feed cable to lie enclosed when positioned inside the supporting structure. Adjacent mounting is accomplished using a grooved shoulder on the antenna support fixture.

- **Rugged construction** — Assures system reliability.
- **High selectivity (PD1142)** — Limits interference from nearby systems.
- **Wide bandwidth (BA3010)** — Facilitates duplexing or combining.

Ordering Information

Item Number	Frequency Range - MHz
PD1142-1	25-30
PD1142-2A	30-35
PD1142-2B	35-42
PD1142-2C	42-54
PD1142-3	66-88
BA3010-1	68-75
BA3010-2	75-81
BA3010-3	81-88

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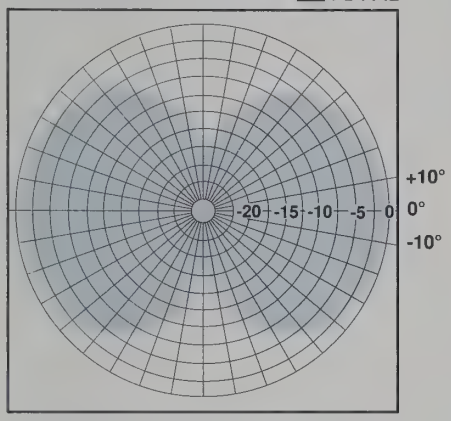
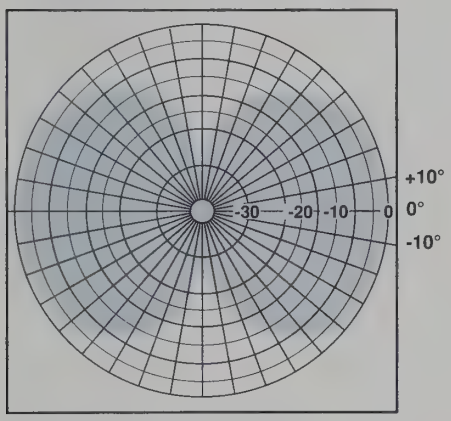
Fiberglass Omnidirectional Antennas

VERTICAL PATTERN ☐ PD1142



VERTICAL PATTERN ☐ BA3010



ELECTRICAL SPECIFICATIONS	PD1142		BA3010
Frequency Range - MHz	25-54	66-88	66-88
Gain - dBd	Unity		Unity
Bandwidth - MHz for 1.5:1 VSWR	.4	.9	7
Vertical Beamwidth 1/2 Power Points	75°	75°	90°
Maximum Power Input - Watts	250		250
Lightning Protection	Direct Ground		Direct Ground
Termination - Direct Fixed	UHF female		N-female
Flexible Extension - Supplied	18 in. (457 mm) RG8A/U Flexible Cable with UHF male and N-male Connectors Attatched		None

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD1142 @ 30 MHZ	PD1142 @ 66MHZ	BA3010
Overall Length - ft. (m)	16 (4.88)	8.2 (2.50)	8.1 (2.47) @ 70 MHz
Whip Length - ft. (m)	6.7 (2.04)	2.4 (.73)	—
Element Housing Length - ft. (m)	8.3 (2.54)	4.8 (1.46)	7.1 (2.15)
Support Pipe Diameter - in. (mm)	1.66 (.42)	1.66 (.42)	—
Support Pipe Mounting Length - ft. (m)	1 (.31)	1 (.31)	—
Weight - lbs. (kg)	10 (4.5)	7 (3.2)	13.2 (5.98)
Radiating Element Material	Copper Alloy		Copper Alloy
Element Housing Material	Fiberglass		Fiberglass
Support Pipe Material	6061-T6 Aluminum		Aluminum
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	.075 (.07)	.045 (.04)	1.4 (.13) @ 70 MHz
Rated Wind Velocity - mph (km/hr)	100 (161)	125 (201)	125 (201)
Lateral Thrust @ 100 mph - lbs. (kg)	30 (13.6)	18 (8.2)	56 (25.4)
Bending Moment 1 in. (25 mm) Below Top of Support Pipe @ 100 mph - ft./lbs. (m/kg)	170 (23.6)	60.2 (8.3)	202 (28.0)
Mounting Hardware - Supplied PD1142 Slimline Clamp Set for structures have 1-1/2 in. (38 mm) to 3-1/4 in. (82 mm) diameter pipe or up to a 3 x 3 in. (76 x 76 mm) angle member. BA3010 Stainless Steel hardware supplied permits the antenna to be mounted with feed cable running inside a support pipe of 1-1/2 – 2-1/8 in. (38-54 mm) outer diameter or with feed cable outside a support pipe of 3/4 – 2-1/8 in. (20-58 mm) outer diameter.			
Mounting Hardware - Optional PD1142 PD52-5 adapter modifies support pipe for 1-1/4 in. mounting. PD25-5 Mounting Kit contains ratchet mount and upper support.		PD46 Clamp Set	
Shipping Weight - lbs. (kg)	20 (9.1)	10 (4.5)	30.9 (14)
Shipping Volume - ft.^{3} (m^3)	.76 (0.02)	.51 (0.015)	1.1 (.03)
Shipping Mode	Common Carrier	UPS	BA3010-1 C.C. BA3010-2 UPS BA3010-3 UPS

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Omnidirectional 3 dBd Gain Antenna

30-88 MHz

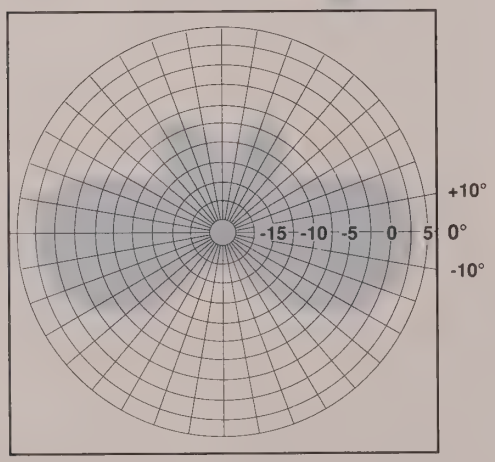
PD315 Full Wave Collinear Antenna

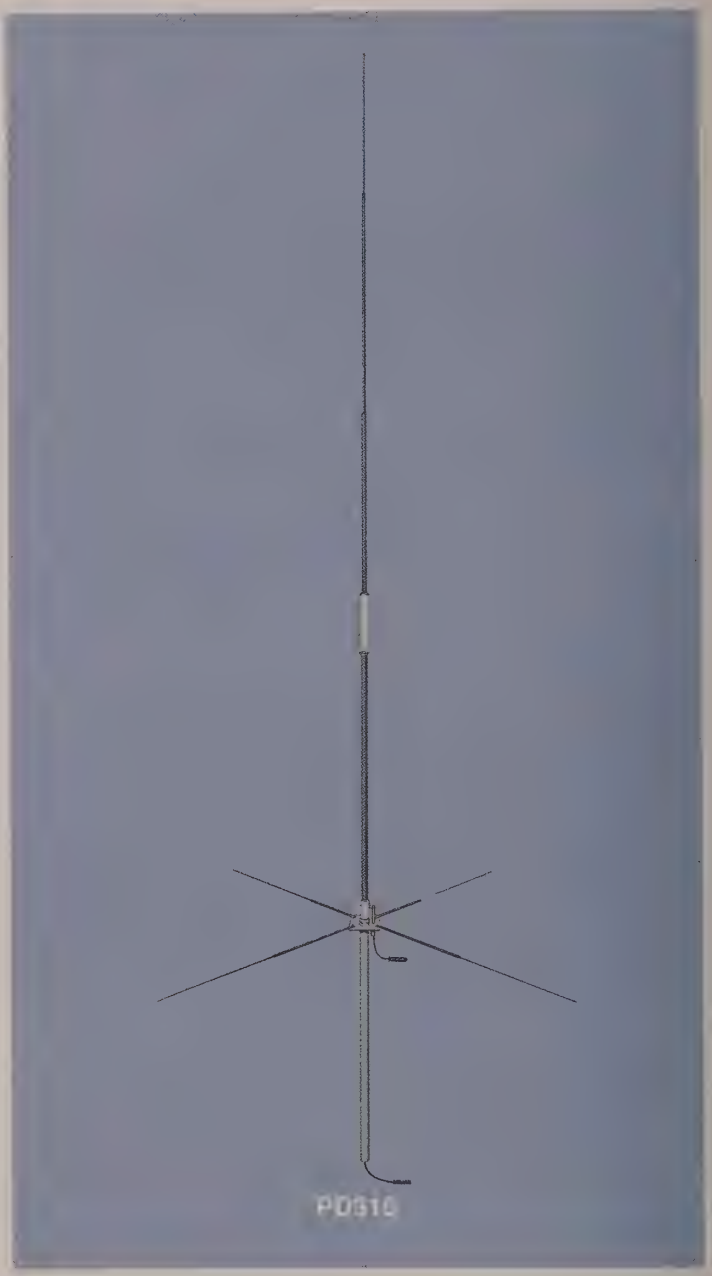
This full wavelength collinear antenna is made for low band applications. Key features include high electrical efficiency and self supporting mounting configuration.

The antenna consists of two sections, a 5/8 wave upper radiating element fed in phase with 3/8 wave lower radiating element. A phasing unit made of 1/4 in. (6 mm) diameter solid rod sealed in a fiberglass housing joins the two elements. The entire antenna has a direct ground potential and is capable of operating successfully in areas of high lightning incidence. The upper element is fabricated of high strength aluminum alloy. The lower element is heavy wall pipe heliarc welded into the base of the aluminum support pipe. The radials are spring-tempered stainless steel.

• **Direct ground**	Protects against lightning damage.
• **Fiberglass enclosed phasing coils**	Protects radiating elements in corrosive environments.

VERTICAL PATTERN ☐ PD315





Ordering Information

Item Number	Frequency Range - MHz
PD315-2	30-54
PD315-3	66-88

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Omnidirectional 3 dBd Gain Antenna

ELECTRICAL SPECIFICATIONS	PD315-2	PD315-3
Frequency Range - MHz	30-54	66-88
Gain - dBd	3	3
Bandwidth - MHz for 1.5:1 VSWR	0.8	1.5
Vertical Beamwidth 1/2 Power Points	38°	38°
Maximum Power Input - Watts	500	500
Lightning Protection	Direct Ground	Direct Ground
Termination - Direct Fixed	UHF female	UHF female
Flexible Extension - Supplied	18 in. (457 mm) RG8A/U Flexible Cable w/N-male Connector Attached	

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD315-2 @ 30 MHz	PD315-3 @ 66 MHz
Overall Length - in. (mm)	39 (11.9)	22 (6.74)
Radiating Element Length - ft. (m)	34 (10.4)	17 (5.18)
Ground Plane Radial Length - ft. (m)	10 (3.05)	4.5 (1.37)
Support Pipe Diameter - in. (mm)	2-7/8 (73)	2-7/8 (73)
Support Pipe Mounting Length - ft. (m)	4 (1.22)	4 (1.22)
Weight - lbs. (kg)	75 (34)	60 (27)
Radiating Element Material	6061-T6 Aluminum (Lower Section)	6061-T6 Aluminum (Lower Section)
Ground Plane Radial Material	17-7PH Stainless Steel	6061-T6 Aluminum
Support Pipe Material	6061-T6 Aluminum	6061-T6 Aluminum
Wind Loading Area Flat Plate Equivalent - $ft.^2$ (m^2)	2.13 (.198)	1.28 (.119)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	85.2 (38.6)	51.2 (23.2)
Bending Moment 6 in. (152 mm) Below Ground Plane @ Rated Wind - ft./lbs. (m/kg)	1000 (138.3)	330 (46)
Mounting Hardware - Supplied	PD346 Heavy Duty Clamp Set	PD346 Heavy Duty Clamp Set
Shipping Weight - lbs. (kg)	128 (58)	105 (48)
Shipping Volume - $ft.^3$ (m^3)	27 (.77)	17.7 (.50)
Shipping Mode	Common Carrier	Common Carrier

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Single Yagi Antennas

66-225 MHz

PD156S*	**7 dBd Gain, 4 Element Single Yagi**
PD390S	**8 dBd Gain, 5 Element Single Yagi**
PD1158S*	**9 dBd Gain, 6 Element Single Yagi**

***Exact frequencies must be specified.**

Yagi Antennas are commonly used in control station, paging and repeater applications for point to point communications. Their narrow beamwidth and high front-to-back ratio are effective in reducing interference from other systems.

PD156S Single Yagi Antenna is a four element array with its driven element fed through a gamma match assembly to provide a directly grounded structure (66-88 MHz model). This antenna can be oriented for either vertical or horizontal polarization using the mounting hardware provided.

PD390S Single Yagi Antenna is a five element structure that allows either vertical or horizontal polarization using the mounting hardware provided.

PD1158 Single Yagi Antenna is a six element version of the 390S providing 9 dBd forward gain while maintaining a 20 dB minimum front-to-back ratio. The mounting hardware supplied with this antenna will permit either vertical or horizontal polarization.

- **6061-T6 Aluminum elements** Welded solid rod for high strength, low weight and corrosion resistance.
- **High front-to-back ratio** Minimizes interference from and with other systems.

Ordering Information

Item Numbers	Frequency Range - MHz
PD156S-3	66-88*
PD156S-4	150-174*
PD390S-1	144-152
PD390S-2	150-158
PD390S-3	156-164
PD390S-4	162-170
PD390S-5	166-174
PD390S-6	220-225
PD1158S	150-174*

***Exact frequencies must be specified.**

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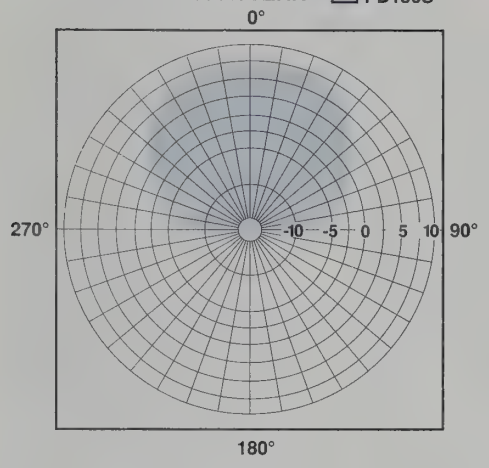
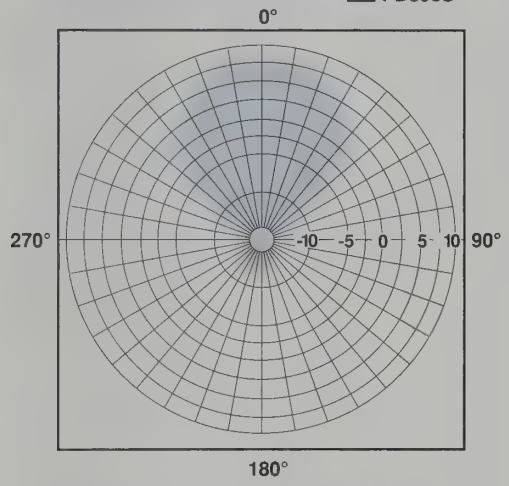
Single Yagi Antennas

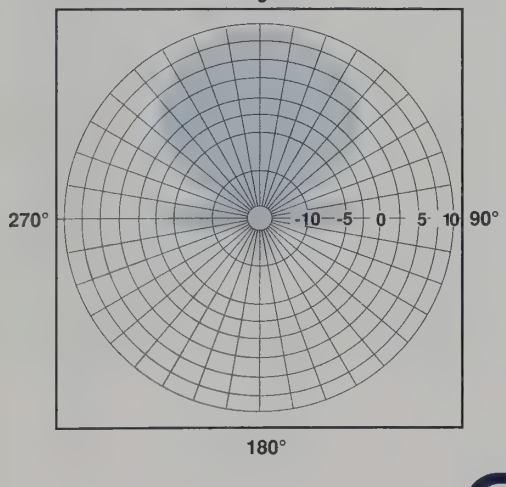
HORIZONTAL PATTERN ☐ PD156S



HORIZONTAL PATTERN ☐ PD390S



HORIZONTAL PATTERN ☐ PD1158S



ELECTRICAL SPECIFICATIONS	PD156S	PD390S	PD1158S
Frequency Range - MHz	66-88 150-174	144-225	150-174
Gain - dBd	7	8	9
Bandwidth - MHz for 1.5:1 VSWR @ 150 MHz	4*	8	10
Horizontal Beamwidth 1/2 Power Points	80°	72°	62°
Vertical Beamwidth 1/2 Power Points	58°	52°	48°
Maximum Power Input - Watts	500	500	500
Front-to-Back Ratio - dBd	20.0	20.0	20.0
Lightning Protection	Direct Ground		
Termination - Direct Flexible	48 in. (1219 mm) RG8A/U Flexible Cable with N-male Connector Attached		

Note: All VSWR data referenced to 50 Ohms.
*66-88 MHz bandwidth is 1.5 MHz.

MECHANICAL SPECIFICATIONS	PD156S	PD390S	PD1158S
Element Length - in. (mm) @ 150 MHz	39 (991)	40-3/8 (1026)	39 (991)
Element Support Length - in. (mm) @ 150 MHz	53 (1346)	71 (1803)	87 (2184)
Weight - lbs. (kg) @ 150 MHz	5 (2.27)	8 (3.63)	9 (4.08)
Element Material	3/8 in. (10 mm) Diameter 6061-T6 Aluminum Rod		
Element Support Material	1-1/16 in. (27 mm) Diameter 6061-T6 Aluminum Pipe		
Wind Loading Area @ 150 MHz Flat Plate Equivalent - ft.² (m²)	.521 (.048)	.825 (.077)	.95 (.088)
Rated Wind Velocity - mph (km/hr) @ 150 MHz	120 (193)	100 (161)	100 (161)
Lateral Thrust @ 100 mph @ 150 MHz - lbs (kg)	20.8 (9.5)	33 (15.0)	38 (17.3)
Torsional Moment @ 150 MHz @ 100 mph with Standard Mounting - ft./lbs. (m/kg)	48.6 (6.7)	75 (10.4)	111 (15.4)
Mounting Hardware - Supplied PD156S (66-88 MHz) PD156S (144-174 MHz) PD390S and PD1158	L-Bracket and PD46 Clamp Set PD237 Crossover Plate PD237 Crossover Plate		
Shipping Weight - lbs. (kg)	15 (6.80)	18 (8.16)	20 (9.07)
Shipping Volume - ft.³ (m³)	3 (0.08)	3.7 (0.1)	4.4 (0.12)
Shipping Mode	Common Carrier	UPS	Common Carrier

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Dual Yagi Antennas

66-225 MHz

PD156D*	**9.3 dBd Gain, 8 Element Dual Yagi**
PD390D	**11 dBd Gain, 10 Element Dual Yagi**
PD1158D*	**12 dBd Gain, 12 Element Dual Yagi**

***Exact frequencies must be specified.**

PD156D Dual Yagi Antenna is an eight element completely grounded structure with the driven elements shunt fed through a coaxial power divider. This antenna is supplied with hardware to permit mounting for vertical polarization. It is ideal for point-to-point and other directional applications.

PD390D Dual Yagi Antenna consists of two 390S Yagis driven thru a coaxial divider. Except for gain and pattern its electrical characteristics are identical to the 390S.

PD1158D Dual Yagi Antenna is a dual version 1158S. Driven elements are fed thru a coaxial power divider. Electrical specifications except for forward gain and pattern characteristics are identical to the 1158S.

• **6061-T6 Aluminum elements**	Welded solid rod for high strength, low weight and corrosion resistance.
• **High front-to-back ratio**	Minimizes interference from and with other systems.
• **Grounded structure**	Protects system from lightning strikes.

Ordering Information

Item Number	Frequency Range - MHz
PD156D-3	66-88*
PD156D-4	144-174*
PD390D-1	144-152
PD390D-2	150-158
PD390D-3	156-164
PD390D-4	162-170
PD390D-5	166-174
PD390D-6	220-225
PD1158D	150-174*

***Exact frequencies must be specified.**

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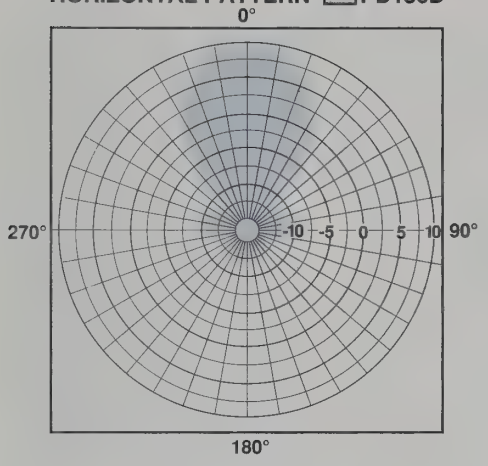
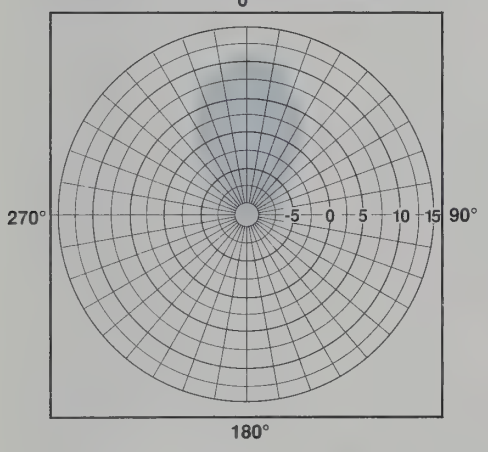
Dual Yagi Antennas

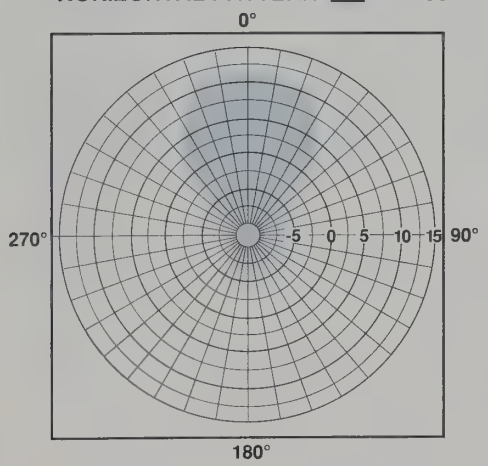
HORIZONTAL PATTERN ☐ PD156D



HORIZONTAL PATTERN ☐ PD390D



HORIZONTAL PATTERN ☐ PD1158D



ELECTRICAL SPECIFICATIONS	PD156D	PD390D	PD1158D
Frequency Range - MHz	66-88 144-174	144-225	150-174
Gain - dBd	9.3	11	12
Bandwidth - MHz for 1.5:1 VSWR @ 150 MHz	4*	8	10
Horizontal Beamwidth 1/2 Power Points	40°	36°	31°
Vertical Beamwidth 1/2 Power Points	58°	52°	48°
Maximum Power Input - Watts	500	500	500
Front-to-Back Ratio - dBd	20.0	20.0	20.0
Lightning Protection		Direct Ground	
Termination - Direct Flexible	N-male	N-male	N-male

Note: All VSWR data referenced to 50 Ohms.
*66-88 MHz bandwidth is 1.5 MHz.

MECHANICAL SPECIFICATIONS	PD156D	PD390D	PD1158D
Element Length - in. (mm) @ 150 MHz	39 (991)	40-3/8 (1026)	39 (991)
Element Support Length - in. (mm) @ 150 MHz	40 (1016)	55 (1397)	70-1/2 (1791)
Antenna Separation - in. (mm) @ 150 MHz	50 (1270)	50 (1270)	50 (1270)
Weight - lbs. (kg) @ 150 MHz	12 (5.44)	19 (8.62)	22 (9.97)
Element Material and Diameter - in. (mm)	6061-T6 Aluminum Rod, 3/8 (10)		
Element Support Material and Diameter - in. (mm)	6061-T6 Aluminum, 1-1/16 (27)		
Spreader Material and Diameter - in. (mm)	6061-T6 Aluminum, 1-5/16 (33)		
Wind Loading Area @ 150 MHz Flat Plate Equivalent - ft.^{2} (m^2)	1.08 (.100)	1.70 (.158)	1.95 (.181)
Rated Wind Velocity - mph (km/hr) @ 150 MHz	120 (193)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs (kg)	43.2 (19.6)	70 (31.8)	75 (34.0)
Bending Moment 24 in. (610 mm) Below Spreader @ 100 mph - ft./lbs. (kg m)	86.1 (11.9)	136 (18.8)	156 (21.6)
Mounting Hardware - Supplied	PD237 Crossover Plate		
Shipping Weight - lbs. (kg)	20 (9.07)	26 (11.8)	32 (14.5)
Shipping Volume - ft.^{3} (m^3)	4.3 (0.12)	4.9 (0.14)	5.5 (0.16)
Shipping Mode	Common Carrier	UPS	Common Carrier

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Ground Plane Antennas

108-512 MHz

PD152* **Unity Gain General Use**
PD453* **Unity Gain Broad Band**
***Exact frequencies must be specified.**

The PD152 is an inexpensive antenna for use where direct ground lightning protection is not a requirement.

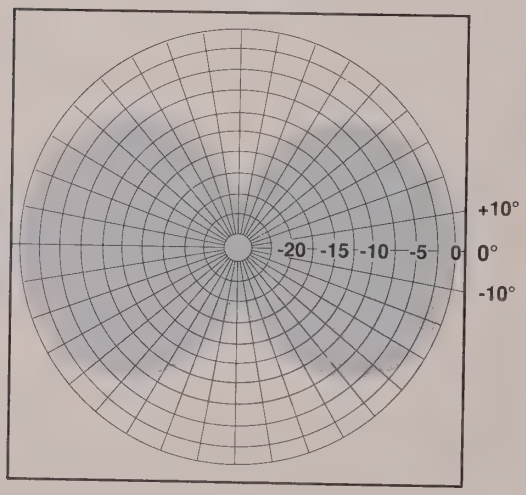
The ground plane structure, consisting of rods in a conical form, assures a precise impedance match at the operating frequency, which can be specified anywhere in the range of 108-512 MHz.

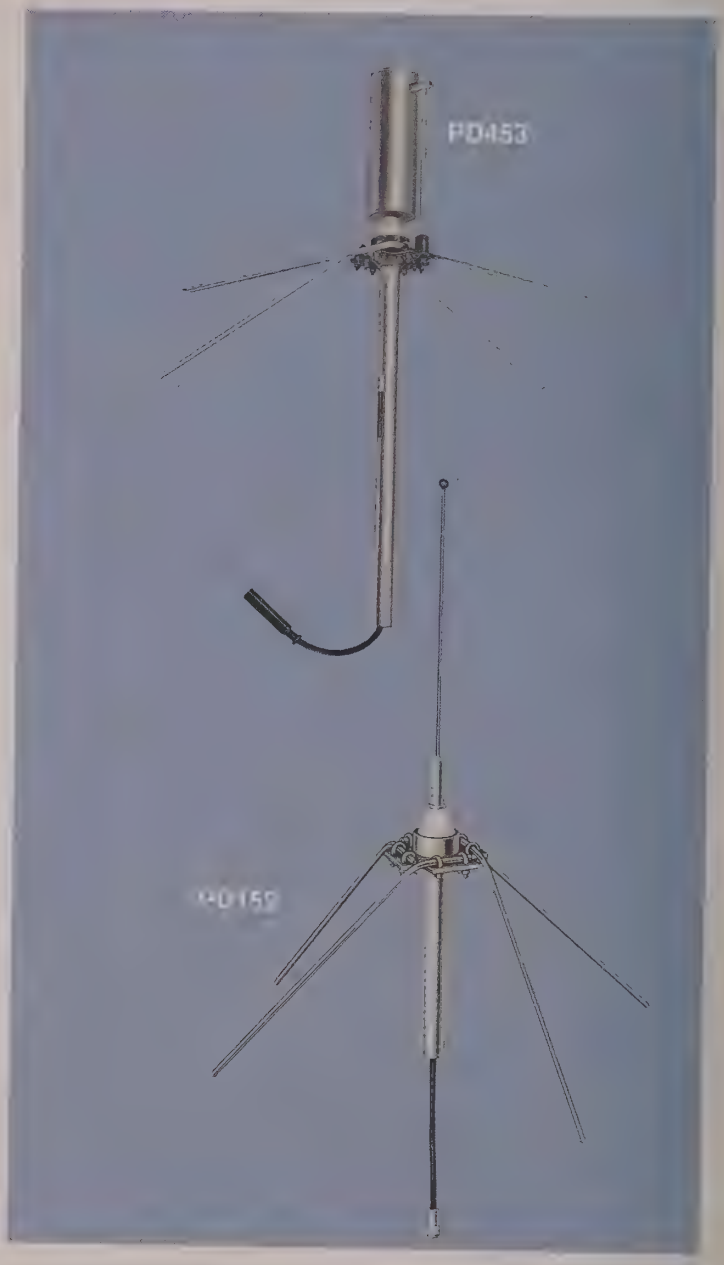
The PD453 is designed for multi-channel applications involving relatively wide frequency excursions such as ground-to-air communication systems. The PD453 offers better than 15% bandwidth capability at under 2.0:1 VSWR between 108 and 174 MHz. This antenna provides DC ground lightning protection.

• **Broad band capability**	Allows use in multi-channel applications.
• **Direct ground (PD453)**	Protects system from lightning strikes and static noise.

VERTICAL PATTERN

PD152 and PD453





Ordering Information

Item Number	Frequency Range - MHz
PD152-4	108-174*
PD152-5	406-512*
PD453	108-174*

***Exact frequencies must be specified.**

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Ground Plane Antennas

ELECTRICAL SPECIFICATIONS	PD152	PD453
Frequency Range - MHz	108-512	108-174
Gain - dBd	Unity	Unity
Bandwidth - MHz for 2.0:1 VSWR	12 @ 150 MHz	24 @ 150 MHz
Vertical Beamwidth 1/2 Power Points	75°	75°
Maximum Power Input - Watts	500 @ 150 MHz	500 @ 150 MHz
Lightning Protection	Star Gap	Direct Ground
Termination - Direct Flexible	18 in. (457mm) RG8A/U Flexible Cable with N-male Connector Attached	Approx. 18" RG11A/U N-male Attached

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD152	PD453
Overall Length - in. (mm)	42-3/8 (1076) @ 150 MHz	36-5/8 (930) @ 150 MHz
Support Pipe Diameter - in. (mm)	1-15/16 (33)	1-15/16 (33)
Support Pipe Length - ft. (m)	2 (.61)	2 (.61)
Weight - lbs. (kg)	6 (2.7)	14 (6.4)
Radiating Element Material	6061-T6 Aluminum	6061-T6 Aluminum
Ground Plane Radial Material	6061-T6 Aluminum	6061-T6 Aluminum
Support Pipe Material	6061-T6 Aluminum	6061-T6 Aluminum
Wind Loading Area Flat Plate Equivalent - $ft.^2$ (m^2)	0.08 (.007) @ 150 MHz	0.40 (.037) @ 150 MHz
Rated Wind Velocity - mph (km/hr)	125 (201)	125 (201)
Lateral Thrust @ 100 mph - lbs. (kg)	3.2 (1.5)	16 (7.3)
Bending Moment 1 in. (25 mm) Below Ground Plane @ 100 mph - ft./lbs. (m/kg)	5.1 (0.7)	12.2 (5.5)
Mounting Hardware - Supplied	PD46 Clamp Set	PD46 Clamp Set
Mounting Hardware - Optional	PD246 Pole Mount PD502 Side Mount (Short) PD504 Side Mount (Long)	PD246 Pole Mount PD502 Side Mount (Short) PD504 Side Mount (Long)
Shipping Weight - lbs. (kg)	18 (8.2)	28 (13)
Shipping Volume - $ft.^3$ (m^3)	0.75 (0.02)	1.0 (0.03)
Shipping Mode	UPS	UPS

Fiberglass Omnidirectional Antennas

118-174 MHz

BA1012	**Unity Gain (Light Weight)**
BA1010	**Unity Gain (Heavy Duty)**
BA1312	**3 dBd Gain (Light Weight)**

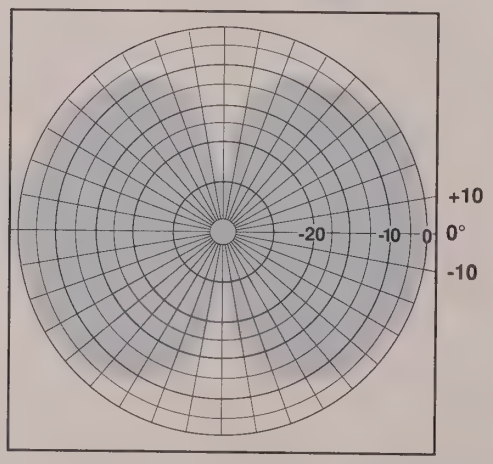
These antennas feature a very broad frequency band, rugged construction and small size.

Radiating elements are constructed of copper alloy, encased in a weather resistant low loss fiberglass radome. The BA1010 "Heavy Duty" is permanently affixed to a unique mounting fixture which allows mounting on top of or along-side of most vertical supports. The BA1012 and BA1312 "Light Weight" models terminate in a 1 inch-14 threaded ferrule which attaches directly to the N275F mounting hardware.

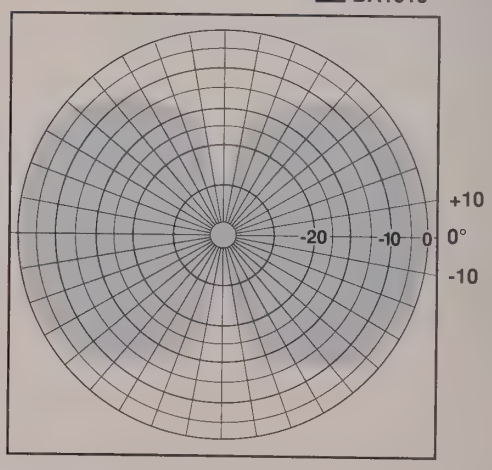
Due to their wide bandwidth, they are ideal for use as emergency backup antennas. Their size and mounting fixtures allow for easy storage and fast installation. Alternative mounting hardware is available for most applications.

- **Broadband** — Reduces backup inventory and the need for multiple antennas.
- **Fiberglass radome** — Protects radiating elements in hostile environments.
- **Copper elements** — Maximizes system performance while minimizing the possibility of intermod.

VERTICAL PATTERN ☐ BA1012



VERTICAL PATTERN ☐ BA1010



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Fiberglass Omnidirectional Antennas

ELECTRICAL SPECIFICATIONS	BA1012	BA1010	BA1312
Frequency Range - MHz	118-174	118-174	118-174
Gain - dB	Unity	Unity	3
Bandwidth - MHz @ 150 MHz for 1.5:1 VSWR	18	18	6
Vertical Beamwidth 1/2 Power Points	90°	80°	35°
Maximum Power Input - Watts	100	250	150
Lightning Protection		Direct Ground	
Termination - Direct Fixed		N-female	

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	BA1012	BA1010	BA1312
Overall Length - ft. (m)	4.5 (1.37)	4.8 (1.45)	9.2 (2.8)
Element Housing Length - ft. (m)	4.1 (1.26)	3.8 (1.16)	8.8 (2.68)
Weight - lbs. (kg)	1.3 (.589)	8.8 (3.99)	3.75 (1.70)
Radiating Element Material		Copper Alloy	
Element Housing Material		Fiberglass	
Support Pipe Material		Aluminum	
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	.23 (.02)	.86 (.08)	.52 (.049)
Rated Wind Velocity - mph (km/hr)	125 (201)	155 (250)	100 (161)
Lateral Thrust at 100 mph - lbs. (kg)	9.2 (4.2)	34.4 (15.6)	21 (9.5)
Bending Moment @ 100 mph - ft. lbs. (kg/m)	16.6 (2.3)	66.6 (9.2)	93 (12.9)

Mounting Hardware - Supplied
BA1012 and BA1312 – N275F universal mast mount is supplied which permits the antenna to be mounted with the feed cable running inside a support pipe of 1-3/8 inch to 1-1/2 inch (35-38 mm) outer diameter or, with feed line running outside a support pipe of 1 to 2-1/4 inch (25-58 mm) outer diameter.

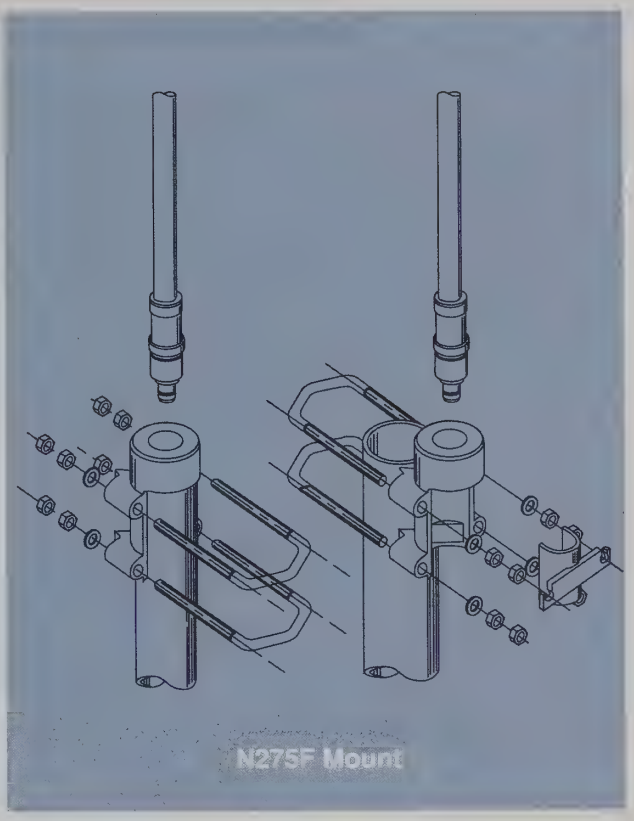
BA1010 – Stainless steel hardware supplied permits the antenna to be mounted with feed cable running inside a support pipe 1-1/2 to 2-1/8 inch (38-54 mm) outer diameter or, with feed cable outside a support pipe of 3/4 to 2-1/8 inch (20-58 mm) outer diameter.

Mounting Hardware - Options
PD32-5 Ten Foot and PD20-5 Five Foot Mast Extension use with N280-1 (1"-14") female adapter N230F Clamp, E179F and N240F Deck Mount.

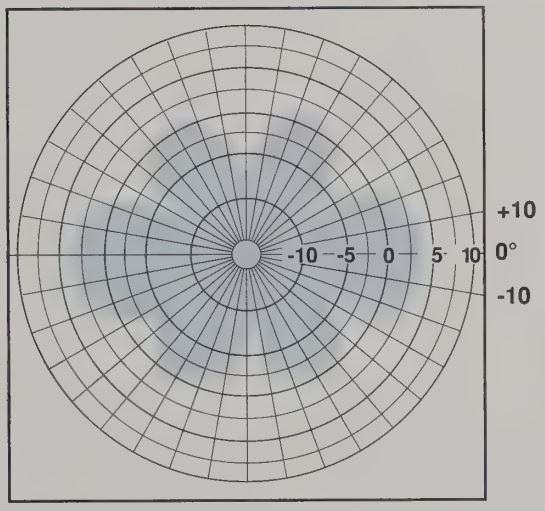
Shipping Weight - lbs. (kg)	13 (5.89)	19.2 (8.71)	5.03 (2.2)
Shipping Volume - ft.³ (m³)	.24 (.006)	.71 (.02)	.37 (.01)
Shipping Mode	UPS	UPS	C.C.

Ordering Information

Item Number	Frequency Range - MHz
BA1012-1	144-162
BA1012-2	154-174
BA1012-G	118-132
BA1010-1	146-164
BA1010-2	154-174
BA1312-1	149-155
BA1312-2	155-163
BA1312-3	163-171



VERTICAL PATTERN ☐ BA1312



Fiberglass Omnidirectional Antenna

144-174 MHz

PD1167* 3 dBd Gain Collinear

***Exact frequencies must be specified.**

This antenna combines the superior performance of an end-fed collinear array with the high strength characteristics and ease of installation of a slim profile fiberglass structure having no ground radials. Heavy wall white fiberglass and 6061-T6 high strength aluminum are the only exposed materials used in the construction of this antenna. The antenna is particularly suitable for use in highly corrosive environments or where mounting restrictions prevent the use of an external ground plane. It may be mounted on conventional marine mounts. *Specify PD52-5 adapter and PD25-5 Mounting Kit.*

• **Fiberglass construction**	Protects radiating elements from hostile environments.
• **Copper elements**	Superior electrical performance.
• **6061-T6 Support**	High strength, inhibits corrosion.
• **Direct ground**	Protects against lightning strikes.

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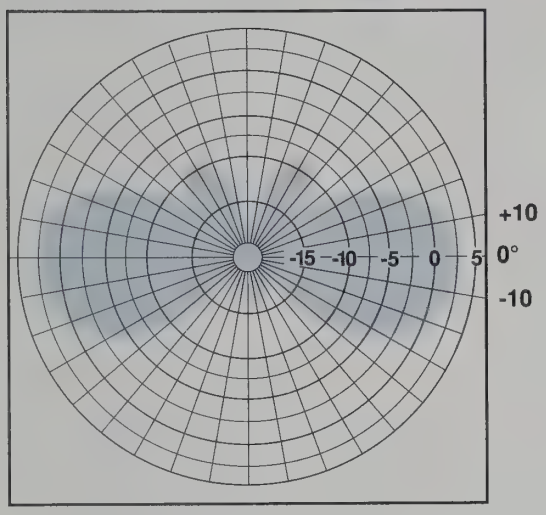
Fiberglass Omnidirectional Antenna

VERTICAL PATTERN ☐ **PD1167**



ELECTRICAL SPECIFICATIONS	PD1167
Frequency Range - MHz	144-174
Gain - dBd	3
Bandwidth - MHz for 1.5:1 VSWR	6.0
Standard Bandwidths - MHz	Specify Center Frequency
Vertical Beamwidth 1/2 Power Points	36°
Maximum Power Input - Watts	500
Lightning Protection	Direct Ground
Termination - Direct Fixed	UHF-female
Flexible Extension - Supplied	18 in. (457 mm) RG8A/U Flexible Cable with N-male Connector Attached

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD1167
Overall Length - ft. (m)	9.3 (2.83)
Element Housing Length - ft. (m)	7.8 (2.38)
Support Pipe Diameter - in. (mm)	1.66 (42)
Support Pipe Length - in. (mm)	12 (305)
Weight - lbs. (kg)	8 (3.63)
Radiating Element Material	Copper Alloy
Element Housing Material	Fiberglass
Support Pipe Material	6061-T6 Aluminum Pipe
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	1.13 (.105)
Rated Wind Velocity - mph (km/hr)	100 (161)
Lateral Thrust at 100 mph - lbs. (kg)	45.2 (20.5)
Bending Moment 2 in. (50.8 mm) Below Top of Support Pipe @ 100 mph - ft./lbs. (m/kg)	210 (29)
Mounting Hardware - Supplied	PD46 Clamp Set
Mounting Hardware - Optional	PD52-5 Adapter Modifies Support Pipe for 1" - 14" (Threaded) Mounting; PD25-5 Mounting Kit Contains a Chrome Plated Brass Ratchet Mount and Lexan Upper Support.
Shipping Weight - lbs. (kg)	20 (9.1)
Shipping Volume - ft.^{3} (m^3)	76 (.02)
Shipping Mode	144-150 MHz Common Carrier 150-174 MHz UPS

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Broadband Fiberglass Collinear Antennas

136-225 MHz

PD220	**5.25 dBd Super Stationmaster™**
PD620	**5.25 dBd Heavy Duty Super Stationmaster™**

Both PD220 and PD620 Super Stationmaster VHF base station antennas incorporate the design features of 9 MHz broadband capability, improved lightning protection and true omnidirectional gain in excess of 5 dBd.

The PD620 represents an extra rugged version of the PD220, with specially strengthened housing and support pipe for use in very severe environments. *Note: Below 150 MHz, rated gain for both antennnas is 4.8 dBd due to length constraints.*

Side mounting hardware is available for the PD220 to achieve special radiation patterns. The PD555 reflector assembly may be utilized with the PD220 for both side and top mounted installations. See page 62 on Special Radiation Patterns for details.

Vertical Beam Downtilt: the PD220-DT and PD620-DT may be ordered with 3° downtilt. *Note: Operational gain and bandwidth are lessened with downtilt. The PD220-DT and PD620-DT are both reduced to 5.0 dBd gain and 1.5 MHz bandwidth. When downtilt antennas are ordered, exact frequency must be specified.*

- **Fiberglass construction** — Protects radiating elements in corrosive environments.
- **DC grounded** — Affords lightning protection.
- **Copper radiating elements.** — Minimizes possibility of intermod generation.

Ordering Information

Item No.	Frequency Range - MHz	Item No.	Frequency Range - MHz
PD220-1	136-144	PD620-1	136-141
PD220-2	144-148	PD620-2	142-151
PD220-3	150.5-158.5	PD620-3	150-159
PD220-4	151.5-159.5	PD620-4	155-164
PD220-5	155-163	PD620-5	157-166
PD220-6	162-170	PD620-6	160-169
PD220-7	166-174	PD620-7	165-174
PD220-8	216-225		

Downtilt Option:
PD220DT and PD620DT - Specify exact frequency.

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Broadband Fiberglass Collinear Antennas

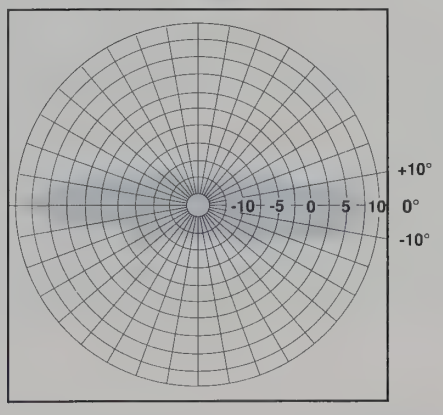
ELECTRICAL SPECIFICATIONS	PD220	PD220-DT	PD620	PD620-DT
Frequency Range	136-174 216-225	136-174	136-174	136-174
Gain - dBd	5.25	5.0	5.25	5.0
Bandwidth - MHz for 1.6:1 VSWR	9.0	1.5	9.0	1.5
Vertical Beamwidth 1/2 Power Points	18°	18°	18°	18°
Maximum Power Input - Watts	500	500	500	500
Lightning Protection	Direct Ground	Direct Ground	Direct Ground	Direct Ground
Termination - Direct Fixed	UHF-female	UHF-female	UHF-female	UHF-female
Flexible Extension - Supplied	18 in. (457mm) RG8A/U Flexible Cable with N-male Connector Attached			

Note: All VSWR data referenced to 50 Ohms.

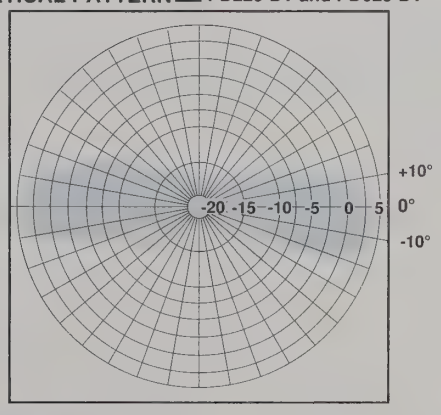
MECHANICAL SPECIFICATIONS	PD220	PD220-DT	PD620	PD620-DT
Overall Length - ft. (m)	22 (6.71)	22 (6.71)	23 (7.01)	23 (7.01)
Element Housing Length - ft. (m)	20 (6.10)	20 (6.10)	20 (6.10)	20 (6.10)
Support Pipe Diameter - in. (mm)	2-3/4 (70)	2-3/4 (70)	3-1/2 (89)	3-1/2 (89)
Support Pipe Mounting Length - in. (mm)	24 (610) Min., Freq. Band Dependent		36 (914)	36 (914)
Weight - lbs. (kg)	23 (10.5)	23 (10.5)	53 (24.1)	53 (24.1)
Radiating Element Material	Copper	Copper	Copper	Copper
Element Housing Material	Fiberglass	Fiberglass	Fiberglass	Fiberglass
Support Pipe Material	6061-T6 Aluminum Pipe	6061-T6 Aluminum Pipe	6061-T6 Aluminum Pipe	6061-T6 Aluminum Pipe
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	1.98 (.184)	1.98 (.184)	2.37 (.220)	2.37 (.220)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)	175 (282)	175 (282)
Rated Wind Velocity with 1/2 in. (13mm) of Radial Ice - mph (km/hr)	85 (137)	85 (137)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	79 (35.9)	79 (35.9)	94.8 (43)	94.8 (43)
Bending Moment 1 in. (25mm) Below top of Support Pipe @ 100 mph (160 km/hr) with No Ice - ft./lbs. (m/kg)	521 (72)	521 (72)	850 (118)	850 (118)
Mounting Hardware - Supplied	PD46 Clamp Set	PD46 Clamp Set	PD346 Clamp Set	PD346 Clamp Set
Mounting Hardware - Optional PD220* PD620*	PD241 Wall Mount, PD246 Pole Mount, PD556 Side Mount (Short), PD503 Side Mount (Long) PD561 Side Mount (Long)			
Shipping Weight - lbs. (kg)	58 (26.4)	58 (26.4)	106 (48.2)	106 (48.2)
Shipping Volume - ft.^{3} (m^3)	2.7 (.08)	2.7 (.08)	5.6 (.16)	5.6 (.16)
Shipping Mode	Common Carrier	Common Carrier	Common Carrier	Common Carrier

*Recommend using PD220 when using side mounting.

VERTICAL PATTERN ☐ PD220 and PD620



VERTICAL PATTERN ☐ PD220-DT and PD620-DT



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Fiberglass Collinear Antenna

120-174 MHz

PD200* **5.8 dBd Gain Stationmaster™**

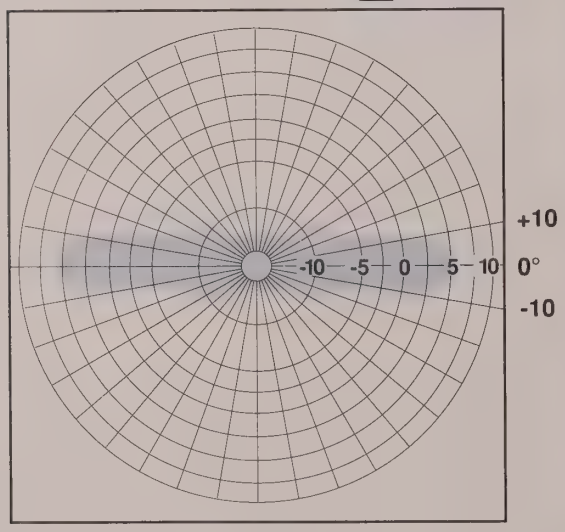
***Specify center frequency.**

The antennas in this internationally known series are ideal for multiple antenna installations. Each feature multiple collinear radiating copper elements fed in phase and enclosed in a weatherproof fiberglass housing. Able to withstand winds of at least 100 mph, these antennas are equipped with a Teflon® insulated connector at the base of the support pipe, a flexible extension cable with a captive pin N-male connector and a Neoprene weathershield. The PD200 has been specifically designed for simplex systems, dispatch and paging applications in the 120-174 MHz frequency range. Specify center frequency when ordering.

- **Fiberglass construction** — Protects radiating elements in corrosive environments.
- **Copper radiating elements** — Minimizes the possibility of intermod generation.
- **High strength, low cross section** — Withstands winds of up to 100 mph.

Teflon® is a registered trademark of Du Pont.

VERTICAL PATTERN ☐ PD200



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Fiberglass Collinear Antenna

ELECTRICAL SPECIFICATIONS	PD200
Frequency Range - MHz	120-174
Gain - dBd	5.8 @ 144-174 MHz
Bandwidth - MHz for 1.5:1 VSWR	1.5 @ 150 MHz
Standard Bandwidths - MHz	Specify Center Frequency
Vertical Beamwidth 1/2 Power Points	18°
Maximum Power Input - Watts	500
Lightning Protection	Direct Ground
Termination - Direct Fixed	UHF-female
Flexible Extension - Supplied	18 in. (457 mm) RG8A/U Flexible Cable with N-male Connector Attached

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD200
Overall Length - ft. (m)	20.8 (6.34)
Element Housing Length - ft. (m) @ 150 MHz	19 (5.79)
Support Pipe Diameter - in. (mm)	2-3/8 (60.3)
Support Pipe Mounting Length - in. (mm)	22 (559)
Weight - lbs. (kg)	20 (9.09)
Radiating Element Material	Copper
Element Housing Material	Fiberglass
Support Pipe Material	6061-T6 Aluminum Pipe
Wind Loading Area Flat Plate Equivalent - $ft.^2$ (m^2)	1.13 (.105)
Rated Wind Velocity - mph (km/hr) @150 MHz	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	45 (20.5)
Bending Moment 1 in. (25 mm) Below Top of Support Pipe @ 100 mph - ft./lbs. (m/kg)	425 (58.9)
Mounting Hardware - Supplied	PD46 Clamp Set
Mounting Hardware - Optional	PD241 Wall Mount PD246 Pole Mount PD302 Side Mount (Short) PD303 Side Mount (Long)
Shipping Weight - lbs. (kg)	51 (23.1)
Shipping Volume - $ft.^3$ (m^3)	2.47 (.070)
Shipping Mode	Common Carrier

Coaxial Gain Antenna

150-174 MHz

PD1107 3 dBd Fiberglass Coaxial

This antenna is ideal for marine environments due to its copper alloy and fiberglass construction. The broad vertical pattern also makes it suitable for use as a mountain top repeater antenna. Two half-wave elements are fed in phase and sealed in a white fiberglass housing. The base assembly consists of a 1/4 wave copper decoupling skirt and brass support pipe. PD46 heavy duty mounting clamps are supplied. This antenna provides direct ground lightning protection.

- **Coaxial design** — Lighter weight.
- **Fiberglass housing** — Protection against hostile environments.
- **Copper elements** — Minimizes possibility of intermod generation.
- **Direct ground** — Protects against lightning strikes.

Ordering Information

Item Number	Frequency Range - MHz
PD1107-1	150-156
PD1107-2	156-162.5
PD1107-3	162-168
PD1107-4	168-174

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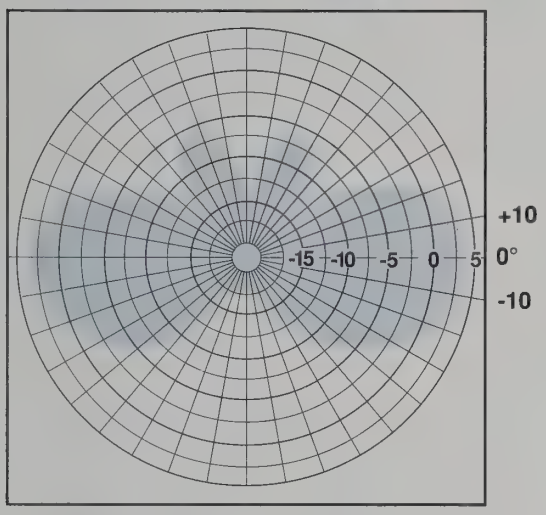
Coaxial Gain Antenna

VERTICAL PATTERN ☐ PD1107



ELECTRICAL SPECIFICATIONS	PD1107
Frequency Range - MHz	150-174
Gain - dBd	3
Bandwidth - MHz for 1.5:1 VSWR	6.0
Vertical Bandwidth 1/2 Power Points	36°
Maximum Power Input - Watts	500
Lightning Protection	Direct Ground
Termination - Direct Flexible	18 in. (457 mm) RG8A/U Flexible Cable with N-male Connector Attached

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD1107
Overall Length - ft. (m) @ 150 MHz	10.9 (3.33)
Element Housing Length - ft. (m)	6-3/4 (2.06)
Skirt Diameter - in. (mm)	2 (50.8)
Support Pipe Diameter - in. (mm)	1-1/8 (28.6)
Support Pipe Mounting Length - in. (mm)	24 (610)
Weight - lbs. (kg)	8 (3.63)
Radiating Element Material	Copper Alloy
Element Housing Material	Fiberglass
Skirt Material	Copper Alloy
Support Pipe Material	Brass
Wind Loading Area @ 150 MHz Flat Plate Equivalent - $ft.^2$ (cm^2)	.623 (.058)
Rated Wind Velocity - mph (km/hr)	85 (137)
Lateral Thrust at Rated Wind - lbs. (kg) @ 150 MHz	18 (8.2)
Bending Moment 6 in.(152 mm) Below Skirt @ Rated Wind - ft./lbs. (m/kg)	35 (4.9)
Mounting Hardware - Supplied	PD46 Clamp Set
Mounting Hardware - Options	PD241 Wall Mount PD246 Pole Mount PD502 (Short) Side Mount PD504 (Long) Side Mount
Shipping Weight - lbs. (kg)	23 (10.5)
Shipping Volume - $ft.^3$ (m^3)	1.33 (.04)
Shipping Mode	Common Carrier

Exposed Dipoles

144-178 MHz

PD1121 **3 dBd Gain Offset**
PD344* **4.5 dBd Gain Offset**

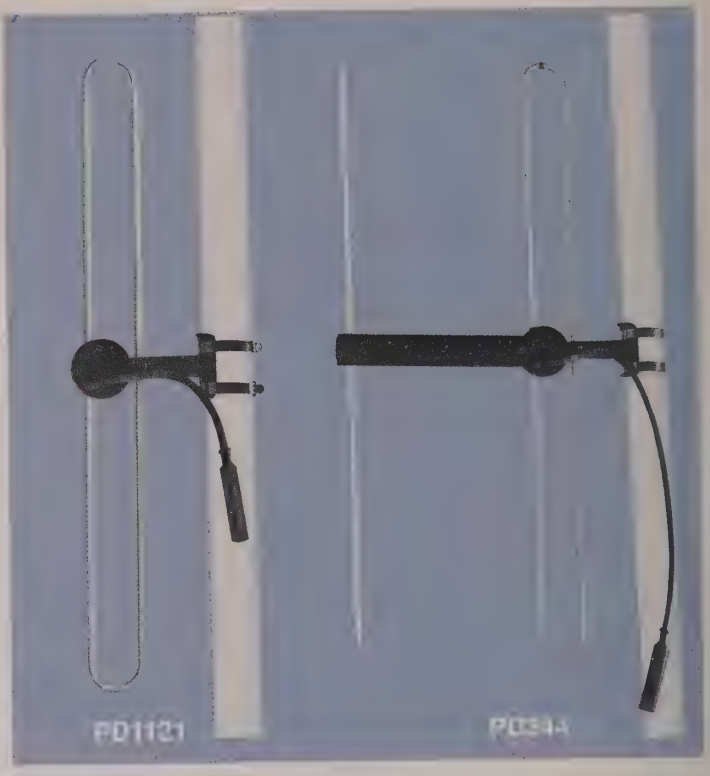
***Exact frequencies must be specified.**

These Celwave side mount dipole antennas have been designed to provide economical offset gain radiation patterns.

The PD1121 consists of a single dipole assembly with RG11A/U matching transformer and is supplied less the support pipe.

The PD344 is a single folded dipole and director rod assembly providing 4.5 dBd offset gain in the 144-174 MHz frequency range.

- **Solid rod 6061-T6 radiators** Minimizes possibility of physical damage.
- **Molded insulators** Improved resistance to temperature and humidity extremes.

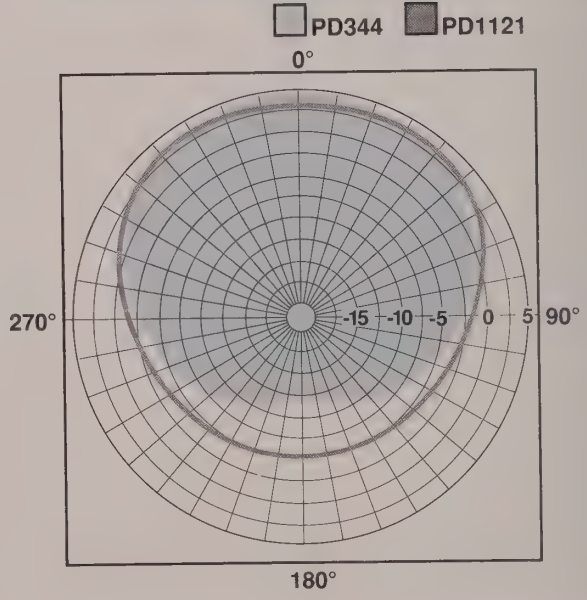


Ordering Information

Item Number	Frequency Range - MHz
PD1121-1	144-152
PD1121-2	146-154
PD1121-3	149-155
PD1121-4	152-158
PD1121-5	154-160
PD1121-6	154-162
PD1121-7	156-164
PD1121-8	159-165
PD1121-9	160-168
PD1121-10	163-169
PD1121-11	164-172
PD1121-12	166-172
PD1121-13	168-176
PD1121-14	170-178
PD344	148-174*

***Exact frequencies must be specified.**

HORIZONTAL PATTERN



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Exposed Dipoles

ELECTRICAL SPECIFICATIONS	PD1121	PD344
Frequency Range - MHz	144-178	148-174
Gain - dB	3	4.5
Bandwidth - MHz for 1.5:1 VSWR	6	4
Horizontal Beamwidth 1/2 Power Points	Dependent Upon Tower	
Vertical Beamwidth 1/2 Power Points	80°	60°
Maximum Power Input - Watts	250	250
Lightning Protection	Direct Ground	Direct Ground
Termination - Direct Flexible	18"(457 mm) RG8A/U Cable with N-male Connector Attached	18" (457 mm) RG11A/U Cable with N-male Connector Attached

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD1121	PD344
Overall Length - in. (mm) @150 MHz	35-5/8 (905)	35-5/8 (905)
Weight - lbs. (kg.)	3 (1.36)	5 (2.27)
Radiating Element Material	3/8 in. (9.53 mm) 6061-T6 Aluminum Rod	
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	0.23 (.021)	0.35 (.033)
Rated Wind Velocity - mph (km/hr.)	100 (161)	100 (161)
Lateral Thrust at 100 mph - lbs. (kg)	9 (4.1)	14 (6.3)
Torsional Moment @ 100 mph w/std. Mounting - ft./lbs. (kg/m)	3 (.42)	9 (1.25)
Mounting Hardware - Supplied	Stainless Steel Clamps Mounts to 2-1/2 in. (63.5 mm) Diameter Pipe	
Shipping Weight - lbs. (kg)	10 (4.5)	15 (6.8)
Shipping Volume - ft.^{3} (m^3)	1.0 (.028)	1.5 (.04)
Shipping Mode	UPS	UPS

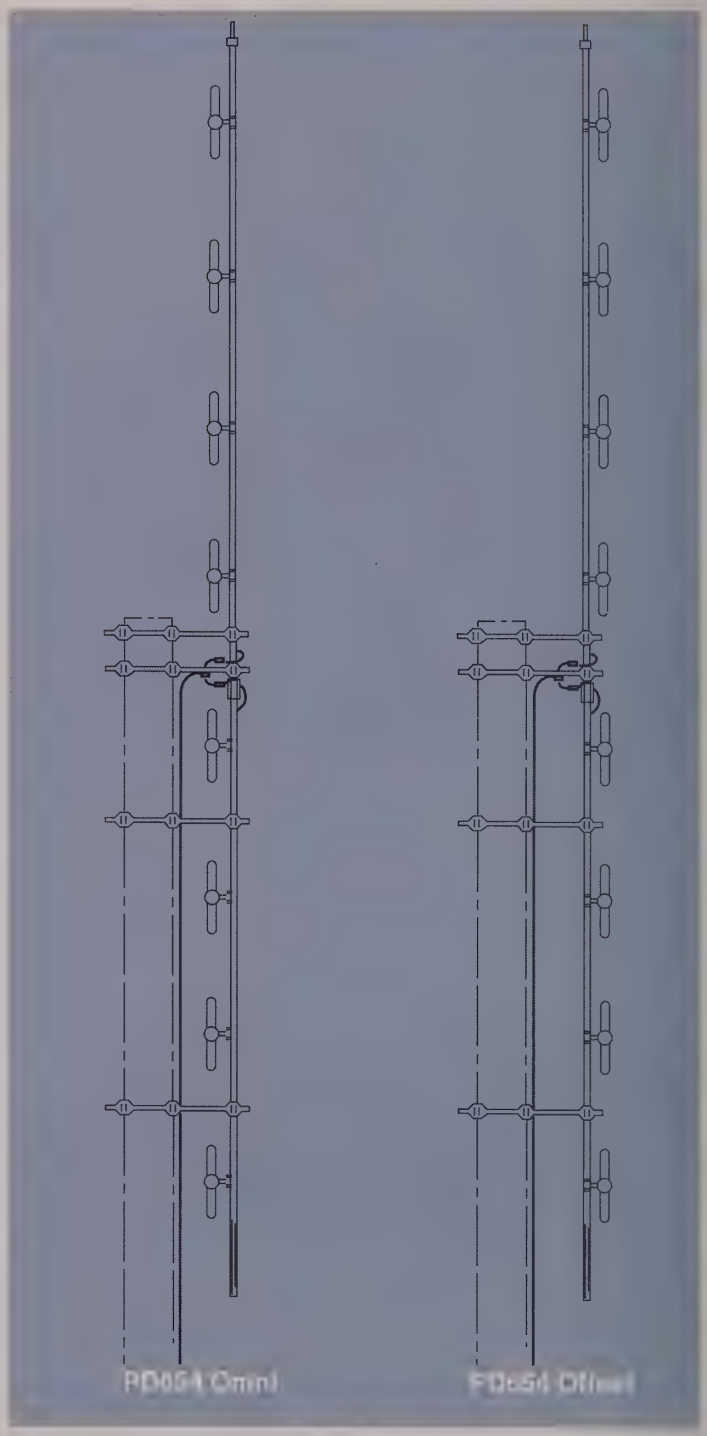
Broadband Exposed Dipole Array

140-174 MHz

PD654 — 9 dBd Gain Omni, 12 dBd Gain Offset

This rugged array consists of two modified PD340 antennas for a total of eight elements. It is typically sidemounted with its upper half extending above the tower with all mounting hardware provided. These models are shipped standard in two sections and feature 6061-T6 aluminum radiating elements, molded feed point insulations, internal harness cabling, stainless steel element clamps and heavy gauge aluminum lightning spike. Radiation pattern is field adjustable and four piece support mast is available to reduce shipping length. *Specify PD645FP.*

- **Solid rod radiators** Minimizes risk of damage.
- **Weatherproof design** Eliminates moisture problems.
- **Molded insulators** Improved resistance to temperature and humidity extremes.
- **Direct ground** Protects against damage from lightning strikes.



Ordering Information

Item Number Standard	FP Option	Frequency Range - MHz
PD654-3	—	140-150
PD654-1	PD654-FP-1	150-162
PD654-2	PD654-FP-2	162-174

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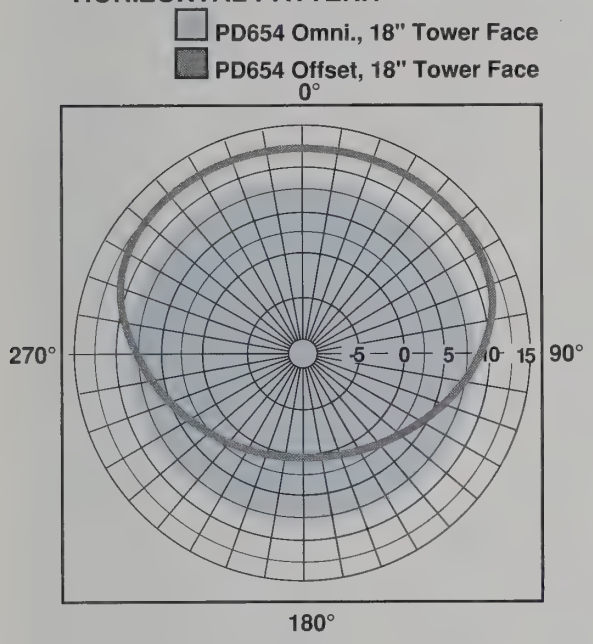
Broadband Exposed Dipole Array

HORIZONTAL PATTERN



ELECTRICAL SPECIFICATIONS	PD654
Frequency Range - MHz	140-174
Gain - dB Omni Offset	9 12
Vertical Beamwidth 1/2 Power Points	8°
Maximum Power Input - Watts	500
Number of Dipoles	8
Lightning Protection	Direct Ground
Termination - Direct Fixed	UHF-female
Flexible Extension - Supplied	N-female

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD654
Overall Length - ft. (m)	45 (13.7)
Support Mast Length - ft. (m)	44 (13.4)
Support Mast Diameter - in. (mm)	2-3/8 (60)
Support Mast Mounting Length - in. (mm)	N/A
Weight, Less Mounts - lbs. (kg)	80 (36.4)
Radiating Element Material	6061-T6 Aluminum
Support Mast Material	6061-T6 Aluminum
Wind Loading Area Flat Plate Equivalent - $ft.^2$ (m^2)	6.25 (.58)
Rated Wind Velocity - mph (km/hr)	100 (161)
Lateral Thrust at 100 mph - lbs. (kg)	250 (114)
Bending Moment 1 in. (25 mm) Below Top of Support Pipe @ 100 mph - ft./lbs. (m/kg)	N/A
Mounting Hardware - Supplied	Two PD502 Sidemount Kits
Shipping Weight - lbs. (kg)	182 (82.7)
Shipping Volume - $ft.^3$ (m^3)	20 (.57)
Shipping Mode	Common Carrier

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Exposed Dipole Arrays

140-174 MHz

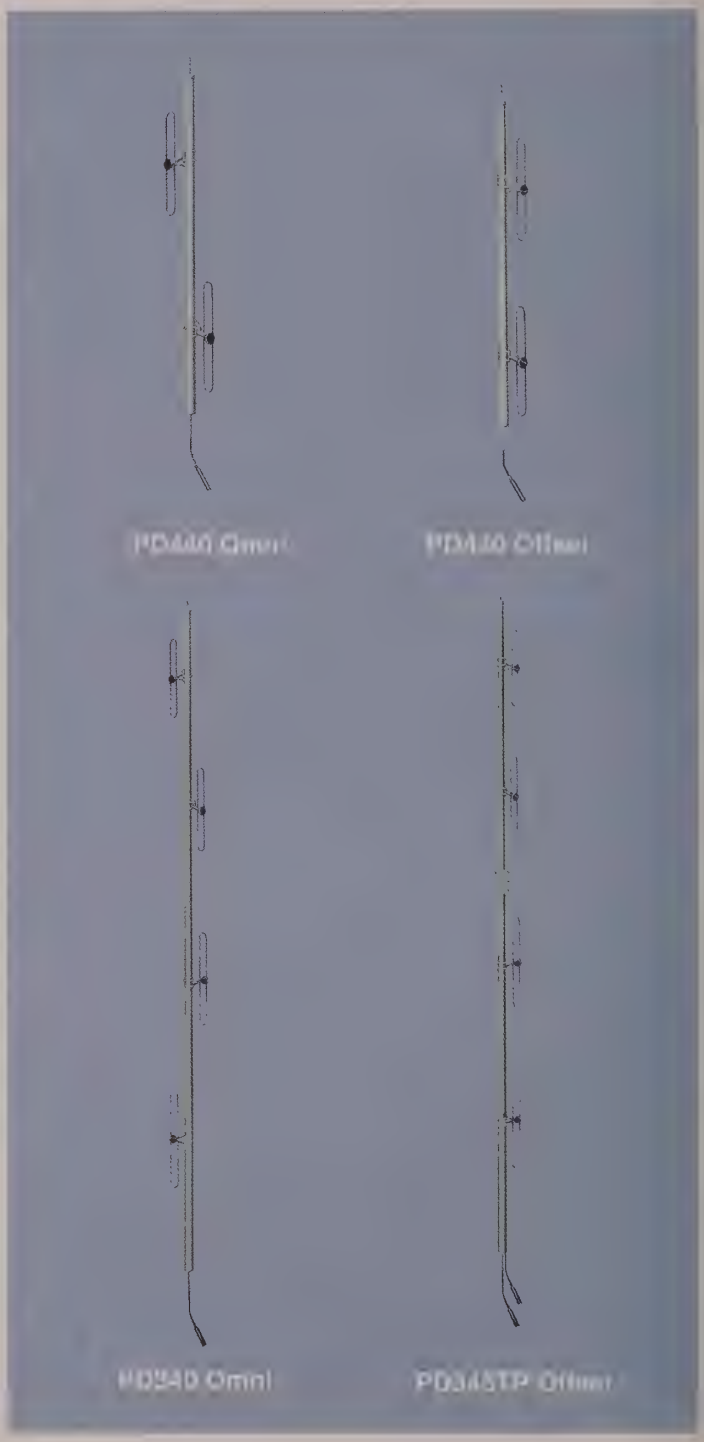
PD440 3 dBd Omni/6 dBd Offset
PD340 6 dBd Omni/9 dBd Offset
PD345 3 dBd Omni/6 dBd Offset Dual

These Celwave broadband antennas provide both omnidirectional and offset configurations.

The PD440 is a two dipole structure providing either 3 dBd gain omni or 6 dBd gain offset (field adjustable). Standard bandwidths available are 140-150 MHz, 150-162 MHz, and 162-174 MHz. This model is available without its support pipe. *Specify PD440-LSP.*

The PD340 is twice the size of the PD440 and uses four dipoles arranged for either 6 dBd omni or 9 dBd offset. This model is field adjustable for omni or offset patterns, has a full 12 MHz bandwidth and is available in the same frequencies as the PD440. Options include a two piece support mast to reduce shipping length and the unit can be ordered less its support pipe. *Specify PD340-LSP.* When ordering replacement harness for the PD340, specify #022752 and frequency.

- **Solid rod radiators** — Minimizes possibility of damage.
- **Weatherproof design** — Eliminates moisture problems.
- **Molded insulators** — Improved resistance to temperature and humidity extremes.



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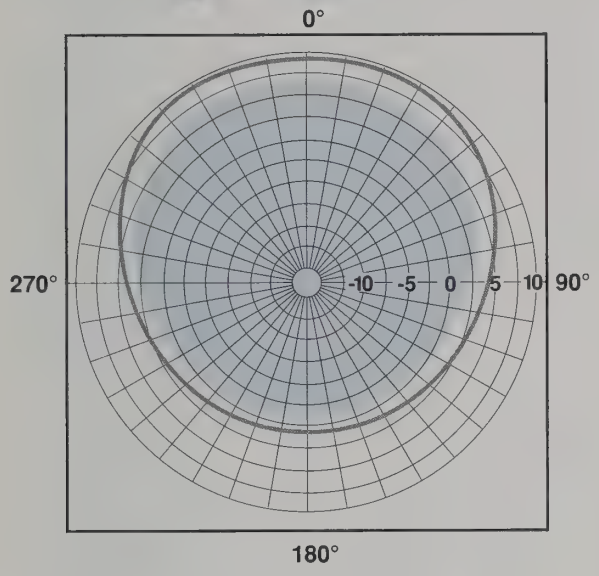
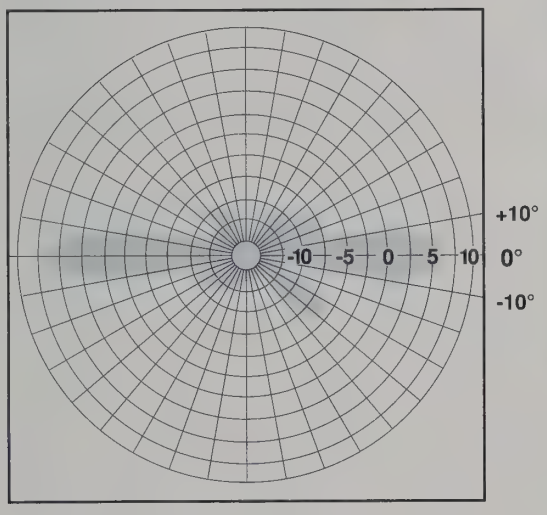
Exposed Dipole Arrays

HORIZONTAL PATTERN (Offset)

PD340 **PD345 and PD440**



VERTICAL PATTERN **PD340**



The PD345 Dual Array Antenna is mechanically the same as the 340 Series Broadband Antennas. It consists of two separate antennas. The upper pair of dipoles is fed by one feedline and the lower pair by a second. Thus, this may be used on two separate systems or one half may be used to transmit and the second half to receive. The isolation between the upper pair and the lower pair is in excess of 30 dB.

When ordering separately, specify the frequency range of the upper and lower antenna 140-150 MHz, 150-162 MHz or 162-174 MHz.

Available options include a two piece support mast to reduce the packaged shipping length. *Specify PD345-LSP.*

Options:

1. LSP Option - Complete antenna array less support pipe.
   PD340-LSP Shipping weight reduced 60 lbs. (27 kg).
   PD345-LSP Shipping weight reduced 60 lbs. (27 kg).
   PD440-LSP Shipping weight reduced 30 lbs. (14 kg.)
2. TP Option - Support pipe provided in two sections.
   PD340-TP Antenna supplied with joining clamp.
   PD345-TP Antenna supplied with joining clamp.

Ordering Information

Standard	Item No. LSP Option (less support pipe)	TP Option (2-piece pipe)	Freq. Range - MHz
PD440-3	PD440-LSP-3	—	140-150
PD440-1	PD440-LSP-1	—	150-162
PD440-2	PD440-LSP-2	—	162-174
PD340-3	PD340-LSP-3	PD340-TP-3	140-150
PD340-1	PD340-LSP-1	PD340-TP-1	150-162
PD340-2	PD340-LSP-2	PD340-TP-2	162-174
PD345-1	PD345-LSP-1	PD345-TP-1	150-162
PD345-2	PD345-LSP-2	PD345-TP-2	162-174

Replacement Harness for PD340, #022752 (Specify Frequency)

Exposed Dipole Arrays

ELECTRICAL SPECIFICATIONS		PD340	PD345	PD440
Frequency Range - MHz		140-174	140-174	140-174
Gain - dBd	(Omni) (Offset)	6 9	3 6	3 6
Bandwidth - MHz 1.5:1 VSWR		12	12	12
Vertical Beamwidth 1/2 Power Points		16°	33°	33°
Maximum Power Input - Watts		500	500	500
Number of Dipoles		4	2 + 2	2
Lightning Protection		Direct Ground	Direct Ground	Direct Ground
Termination - Direct Fixed		UHF-female	UHF-female	UHF-female
Flexible Extension - Supplied		18 inch (457 mm) RG8/U Flexible Cable with N-male Connector Attached		

Note: All VSWR data referenced to 50 ohms.

MECHANICAL SPECIFICATIONS		PD340	PD345	PD440
Overall Length - ft. (m)	@ 140-162 MHz @ 162-174 MHz	22.5 (6.85) 20.5 (6.25)	22.5 (6.85) 20.5 (6.25)	11.5 (3.51) 11.5 (3.51)
Support Mast Length - ft. (m)	@ 140-162 MHz @ 162-174 MHz	22 (6.71) 20 (6.09)	22 (6.71) 20 (6.09)	11 (3.35) 11 (3.35)
Support Mast Diameter - in. (mm)		2-3/8 (60) Diameter, 5/32 (4) Wall Thickness		
Support Mast Mounting Length - in. (mm)		24 (610)	24 (610)	24 (610)
Weight - lbs. (kg)	@ 140-162 MHz @ 162-174 MHz	40 (18.1) 37 (16.8)	40 (18.1) 37 (16.8)	20 (9.1) 19 (8.6)
Radiating Element Material		6061 T-6 Aluminum		
Support Mast Material		6061 T-6 Aluminum		
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	@ 140-162 MHz @ 162-174 MHz	2.98 (.277) 2.75 (.256)	2.98 (.277) 2.75 (.256)	1.48 (.138) 1.38 (.128)
Rated Wind Velocity - mph (km/hr)		100 (161)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	@ 140-162 MHz @ 162-174 MHz	119 (54.1) 110 (50.0)	119 (54.1) 110 (50.0)	59 (26.8) 55 (25.0)
Bending Moment 1 in. (25 mm)) Below Top of Support Pipe @ 100 mph - ft. lbs. (kg m)	@ 140-162 MHz @ 162-174 MHz	1180 (164) 990 (137)	1180 (164) 990 (137)	295 (41) 247 (34)
Mounting Hardware - Supplied		PD46 Clamp Set		
Mounting Hardware - Optional	PD340 and PD345 PD440 Only	PD502 Sidemount (Short) PD502 Sidemount (Short) and PD504 Sidemount (Long)		
Shipping Weight - lbs. (kg)		90 (41)	90 (41)	54 (25)
Shipping Volume - ft.³ (m³)		6.6 (0.19)	6.6 (0.19)	3.75 (0.11)
Shipping Mode		Common Carrier (All Models)		

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Special Radiation Patterns for VHF and UHF

Stationmaster™ & Super Stationmaster™ Series Antennas

The design of this antenna series readily lends itself to use in special radiation pattern applications. Radiation power can be redirected to create additional gain areas or a quiet zone area through the use of a reflector assembly, by side mounting, or by phasing two antennas.

Omnidirectional antennas will exhibit a directional pattern when side mounted (Figure 1). Two top mounted antennas when fed in-phase can also be used to provide a bi-directional pattern (Figure 2).

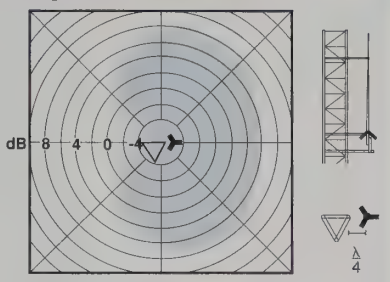
Figure 3 illustrates the narrow, high gain pattern of a side mounted PD220 antenna with PD555 reflector assembly. Figure 4 demonstrates a wide directional pattern of a top mounted antenna with reflector assembly.

We can calculate patterns for specific mounting configurations and antenna product. Contact our Customer Service Department with your particular mounting constraints and pattern needs.

TABLE OF REFLECTOR ASSEMBLIES

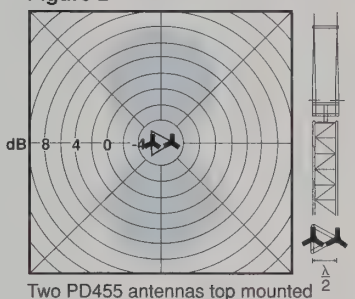
Celwave Antenna PD Number	Reflector Assemblies
PD201	PD671
PD220	PD555
PD400	PD568
PD455	PD568
PD458	PD10000
PD1151	PD1007

Figure 1



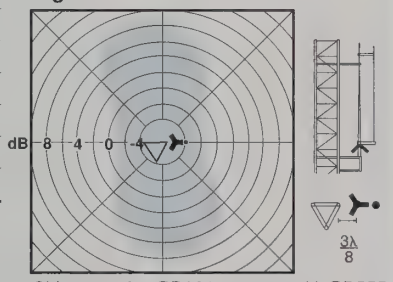
Side-mounted PD220 antenna shown on an 18 inch tower for 180° sector coverage.

Figure 2



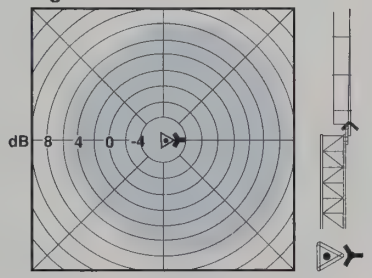
Two PD455 antennas top mounted and fed in phase provide bi-directional coverage.

Figure 3

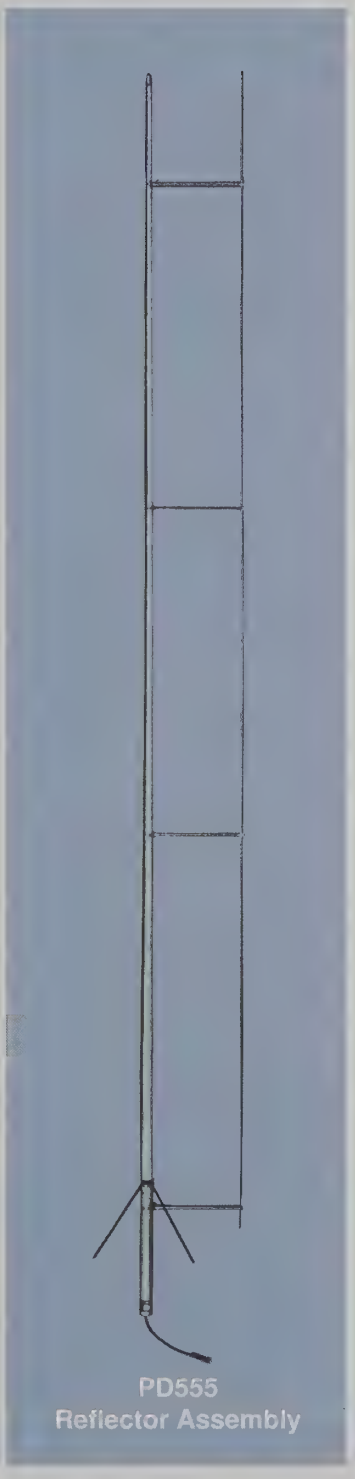


Side-mounting PD220 antenna with PD555 Reflector assembly as shown on an 18 inch tower face for broadside coverage.

Figure 4



Top-mounted PD455 antenna with PD568 Reflector assembly to provide a 5 dBd front-to-back ratio.



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Monopole Antennas/ Single Yagi Antenna

279-281 MHz

PD128 Unity Gain Omnidirectional
PD207 3 dBd Gain Cardioid
PD156S 7 dBd, 4 Element Single Yagi

The PD128 Unity Gain Omnidirectional Monopole, the PD207 3 dBd Cardioid Antenna and the PD156S 7 dBd Gain, Four Element Yagi have been made specifically for use in 280 MHz band paging systems. All three antennas cover the entire 279-281 MHz band without any adjustment.

The PD128 monopole is a small, yet durable antenna, featuring a directly-grounded radiator. The PD207 uses a directive element to give a 3 dBd gain in the forward direction with a 20 dBd front-to-back ratio. This antenna is particularly useful in border areas, where it is desired to provide a low level of signal in the rear of the main coverage area. The PD156S Yagi Antenna is used in point to point applications and when a highly directional signal is desired to restrict a coverage area on the sides as well as in the rear.

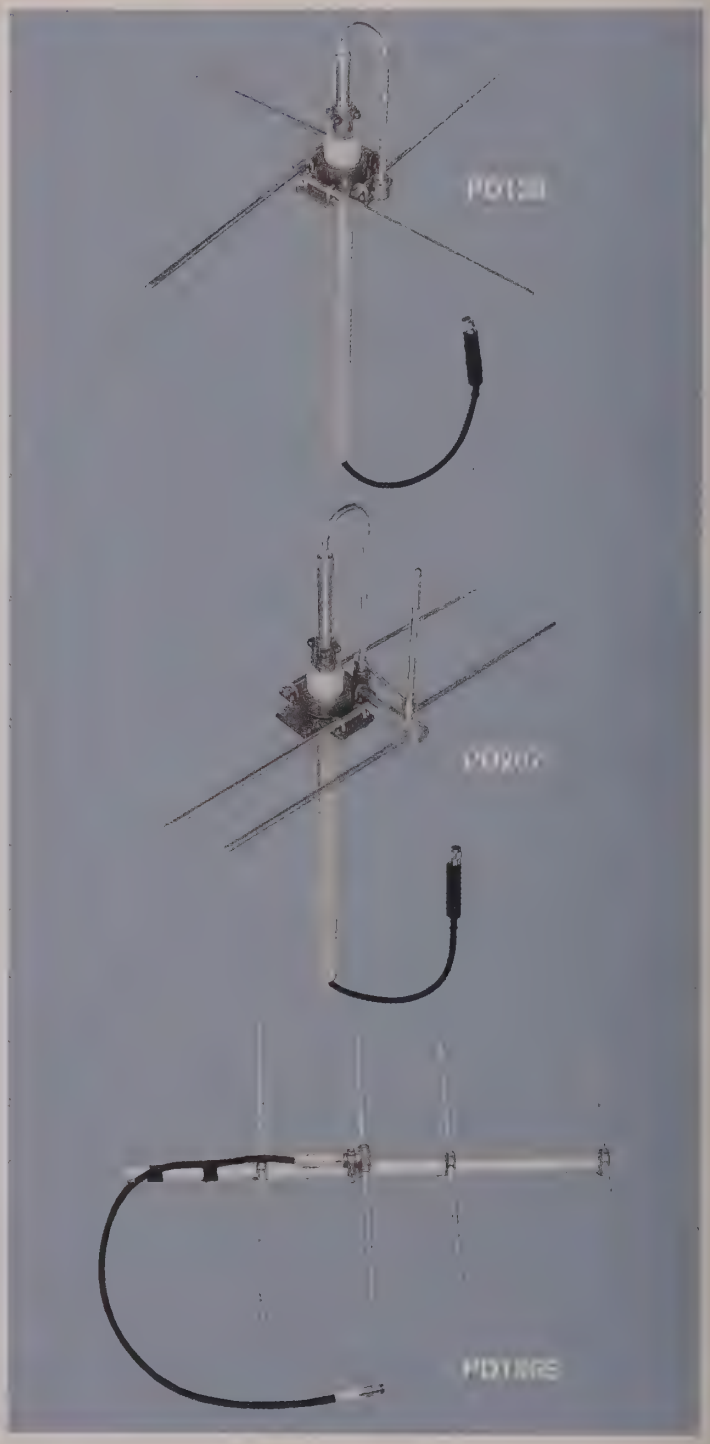
All of these antennas terminate in a type N-male connector with a flexible extension of RG8AU that can be connected directly to the feeder line. The PD128 and PD207 are supplied with a PD46 clamp set for vertical support mounting; the PD156S is supplied with a PD237 crossover clamp set that permits mounting from the rear and orienting in either horizontal or vertical polarization.

- **High-strength 6061-T6 aluminum alloy** — Long service life.
- **End-mounting construction (PD156S)** — Minimizes the effect of the support structure on the radiation pattern.
- **Direct ground (PD128 and PD207)** — Protects against lightning damage.

Ordering Information

Item Number	Frequency Range - MHz
PD128-6	279-281
PD156S-5	279-281
PD207	279-281*

***Specify 279-281 MHz with order.**



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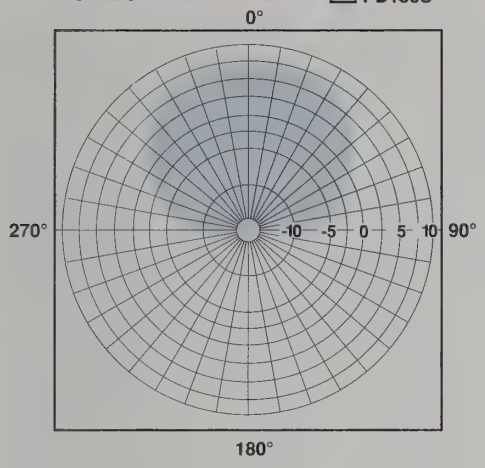
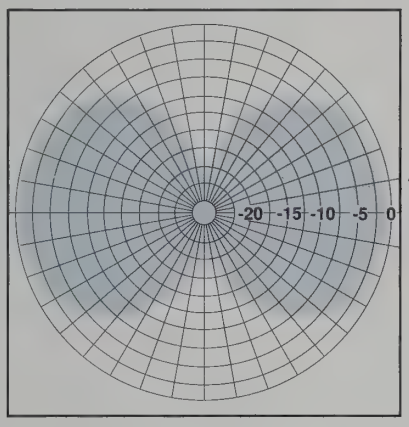
Monopole Antennas/ Single Yagi Antenna

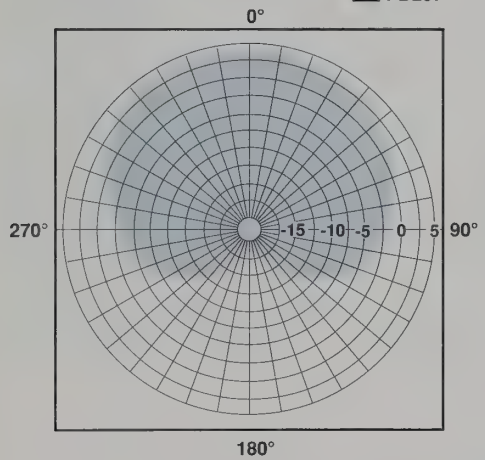
HORIZONTAL PATTERN ☐ PD156S



VERTICAL PATTERN ☐ PD128



HORIZONTAL PATTERN (Cardioid) ☐ PD207



ELECTRICAL SPECIFICATIONS	PD156S	PD128	PD207
Frequency Range - MHz	279-281	279-281	279-281
Gain - dBd	7	Unity	3
Bandwidth - MHz for 1.5:1 VSWR	2	2	2
Horizontal Beamwidth 1/2 Power Points	80°	–	–
Vertical Beamwidth 1/2 Power Points	58°	76°	76°
Maximum Power Input - Watts	500	500	500
Front-to-Back Ratio - dBd	20	N/A	20
Lightning Protection	Direct Ground	Direct Ground	Direct Ground
Termination - Direct Flexible in. (mm)	48 (1219) RG8A/U Flexible Cable with N-male Connector Attached	18 (457)	18 (457)

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD156S	PD128	PD207
Element Length - in. (mm)	21.5 (546.1)	–	–
Element Support Length - in. (mm)	31 (787.4)	–	–
Overall Length - ft. (m)	–	2.9 (0.88)	2.9 (0.88)
Support Pipe Diameter - in. (mm)	–	1-5/16 (33)	1-5/16 (33)
Mounting Length - in. (mm)	–	24 (610)	24 (610)
Weight - lbs. (kg)	3.8 (1.73)	3.8 (1.73)	4.8 (2.18)
Element Material (PD156S)	3/8 in. (10 mm) Diameter 6061-T6 Aluminum Rod		
Radiating Element Material	–	6061-T6 Aluminum Rod and Pipe	6061-T6 Aluminum Rod and Pipe
Element Support Material (PD156S)	1-1/16 in. (27 mm) Diameter 6061-T6 Aluminum Pipe		
Ground Plane Material	–	6061-T6 Aluminum Rod	6061-T6 Aluminum Rod
Director Material	–	6061-T6 Aluminum Rod	6061-T6 Aluminum Rod
Support Pipe Material	–	6061-T6 Aluminum Pipe	6061-T6 Aluminum Pipe
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	.28 (0.03)	.08 (.007)	.09 (.008)
Rated Wind Velocity - mph (km/hr)	120 (193)	125 (201)	125 (201)
Lateral Thrust @ Rated Wind - lbs (kg)	16.2 (7.4)	5 (2.27)	5.6 (2.6)
Mounting Hardware - Supplied	PD237 Crossover Plate	PD46 Clamp Set	PD46 Clamp Set
Mounting Hardware - Optional (PD128 and PD207)	PD246 Pole Mount, PD502 Side Mount (Short) PD504 Side Mount (Long)		
Shipping Weight - lbs. (kg)	7.8 (3.6)	7.8 (3.6)	8.8 (4)
Shipping Volume - ft.^{3} (m^3)	2.6 (0.07)	0.6 (0.02)	0.6 (0.02)
Shipping Mode	UPS	UPS	UPS

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Fiberglass Collinear Antennas

279-281 MHz

PD10191	**Unity Gain Fiberglass Antenna**
PD10204	**3 dBd Gain Fiberglass Antenna**

The PD10191 Unity Gain and PD10204 3 dBd Gain Fiberglass Antennas were specifically designed for use in paging systems in the 280 MHz band. Both antennas cover the entire 279-281 MHz band without any adjustment.

The PD10191, with unity omnidirectional gain, is a small, lightweight, yet durable antenna for many years of roof or tower-top service. The PD10204, with 3 dBd omnidirectional gain, allows the user to make up some or all of the losses incurred in transmission line, filtering or combining systems, to maximize effective radiated power.

Both antennas terminate in a Type N-female connector and are supplied with the rugged PD46 clamp set for mounting on a variety of vertical supports.

• **Copper radiating elements**	Minimized possibility of intermod generation.
• **Fiberglass radome construction**	Protects radiating elements in corrosive environments.
• **Direct ground**	Protects against lightning damage.

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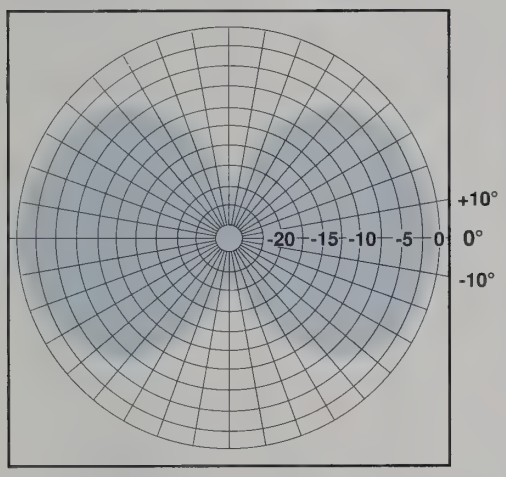
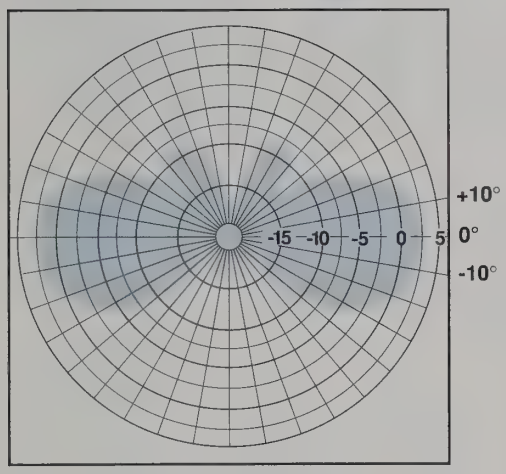
Fiberglass Collinear Antennas

VERTICAL PATTERN ☐ PD10191



VERTICAL PATTERN ☐ PD10204



ELECTRICAL SPECIFICATIONS	PD10191	PD10204
Frequency Range - MHz	279-281	279-281
Gain - dBd	0	3
Bandwidth for 1.5:1 VSWR - MHz	2	2
Vertical Beamwidth 1/2 Power Points	76°	36°
Maximum Input Power - Watts	500	500
Lightning Protection	Direct Ground	Direct Ground
Termination - Direct Fixed	N-female	N-female
Flexible Extension - Supplied	18 in. (457 mm) RG8A/U Cable with N-male Connector Attached	18 in. (457 mm) RG8A/U Cable with N-male Connector Attached

MECHANICAL SPECIFICATIONS	PD10191	PD10204
Overall Length - ft. (m)	4 (1.22)	6.3 (2.07)
Element Housing Length - ft. (m)	3 (0.9)	5.3 (1.74)
Support Pipe Diameter - in. (mm)	1.625 (41.3)	1.625 (41.3)
Support Pipe Length - in. (mm)	12 (304.8)	12 (304.8)
Weight - lbs. (kg)	5 (2.27)	8 (3.63)
Radiating Element Material	Copper	Copper
Element Housing Material	Fiberglass	Fiberglass
Support Pipe Material	6061-T6 Aluminum	6061-T6 Aluminum
Wind Loading Area Flat Plate Equiv. - $ft.^2$ (m^2)	0.3 (0.28)	0.46 (0.02)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)
Laterial Thrust at Rated Wind - lbs. (kg)	12 (5.5)	18.4 (8.36)
Mounting Hardware - Supplied	PD46 Clamp Set	PD46 Clamp Set
Shipping Weight - lbs. (kg)	17 (7.7)	20 (9.1)
Shipping Volume - $ft.^3$ (m^3)	0.52 (0.015)	0.72 (0.02)

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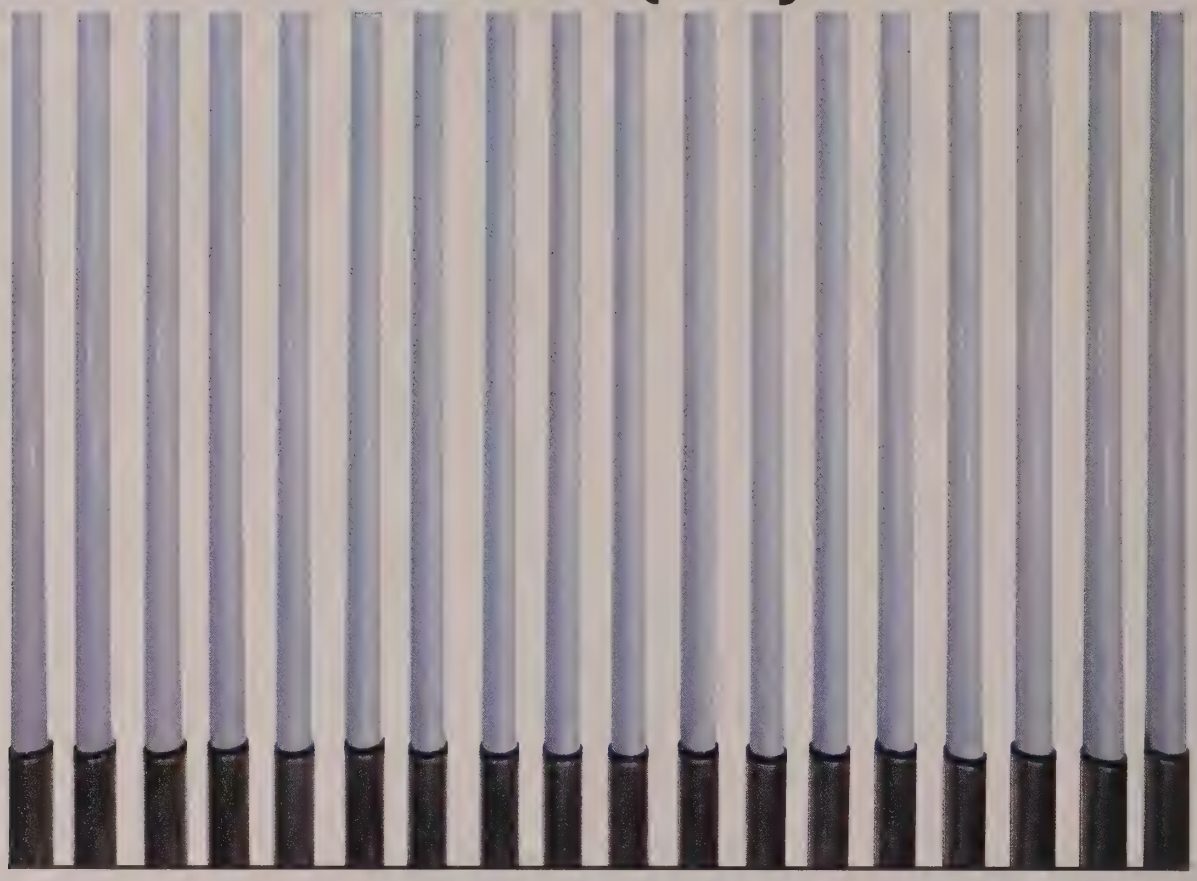
CELWAVE Quality:



We build our radomes tough because Mother Nature's mean

Neither wind, nor rain, nor sleet and snow…not even Mother Nature herself can stay the appointed rounds of CELWAVE antennas.

That's because CELWAVE antennas are designed for long life, dependability and savings. And one of the major reasons is that we build our radomes tough.

With special alloys, resins and bonding adhesives…so the constant temperature expansion, contraction and ultraviolet light deterioration aren't able to break down the fiberglass.

We use a pre-impregnated heavy weight fiberglass cloth to produce a radome that stays waterproof. Water and snow

won't penetrate our antennas, so high performance is maintained without compromise. And a dry radome saves replacement of expensive connectors and coaxial cable.

We manufacture our antennas to maximize their strength…to inhibit ice build up and to minimize wind flex…for years of rugged outdoor use.

Radomes aren't the only thing we're fussy about. Because of Mother Nature's nastiness, we take special care in the construction of all our antennas, cavity devices, duplexers, transmitter combiners and receiver multicouplers.

We go to great lengths to make CELWAVE communications equipment perfect. Because Mother Nature's anything but.

CELWAVE

DIVISION OF RADIO FREQUENCY SYSTEMS

Let's talk about your future.

Fiberglass Omnidirectional Collinear Antennas

406-512 MHz

BA6012 **Unity Gain (Light Weight)**
BA6110 **Unity Gain (Heavy Duty)**
BA6312 **3 dBd Gain (Light Weight)**

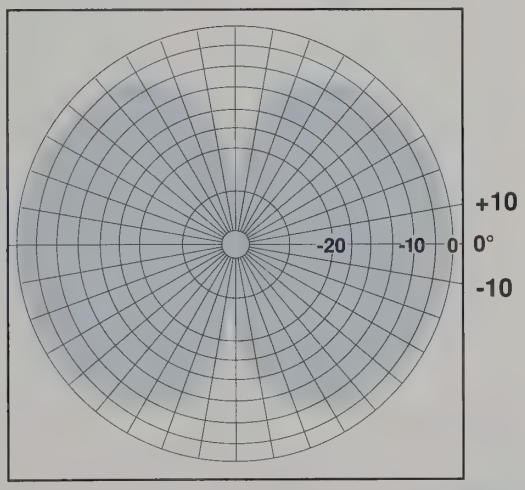
These antennas feature a very broad frequency band, rugged construction and small size.

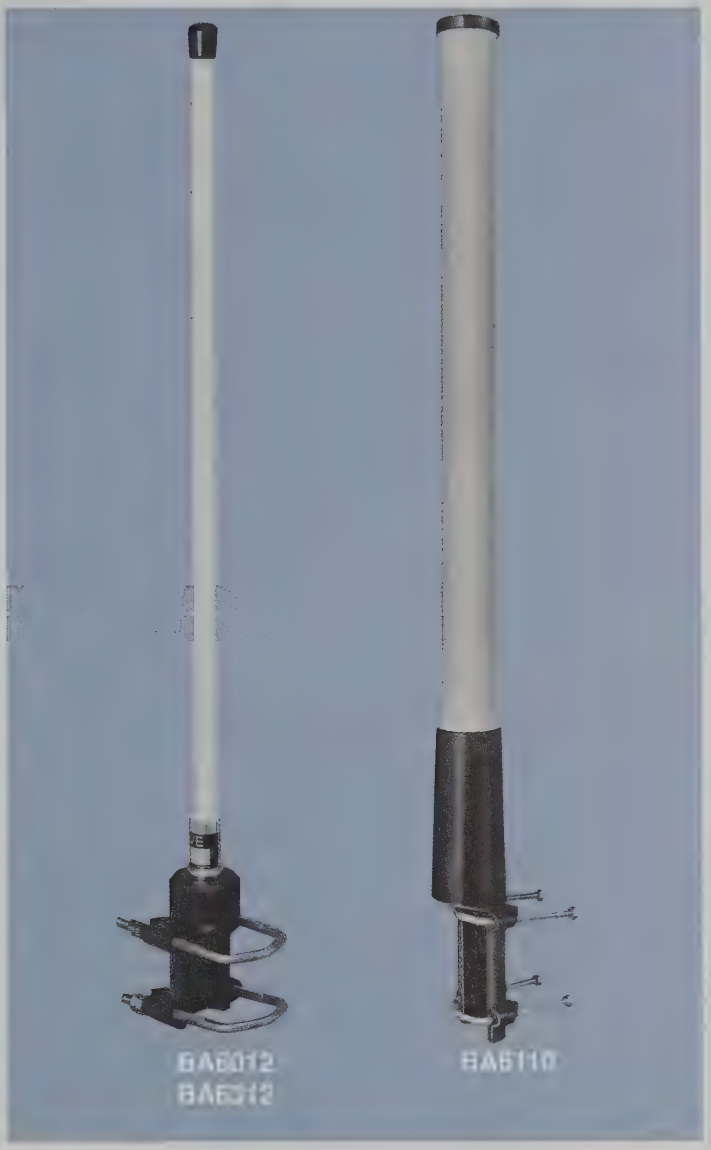
Radiating elements are constructed of copper alloy, encased in a weather resistant low loss fiberglass radome. The BA6110 "Heavy Duty" is permanently affixed to a unique mounting fixture which allows mounting on top of or along-side of most vertical supports. The BA6012 and BA6312 "Light Weight" models terminate in a 1 inch-14 threaded ferrule which attaches directly to the N275F mounting hardware.

Due to their wide bandwidth, they are ideal for use as emergency backup antennas. Their size and mounting fixtures allow for easy storage and fast installation. Alternative mounting hardware is available for most applications.

- **Broadband** — Reduces backup inventory and the need for multiple antennas.
- **Fiberglass radome** — Protects radiating elements in hostile environments.
- **Copper elements** — Maximizes system performance while minimizing the possibility.

VERTICAL PATTERN ☐ **BA6012**





Ordering Information

Item Number	Frequency Range - MHz
BA6012-1	449-471*
BA6012-2	468-492
BA6012-3	488-512
BA6110-1	406-470
BA6110-2	450-512
BA6312-1	449-467
BA6312-2	467-485
BA6312-3	485-503

***Exact frequencies must be specified.**

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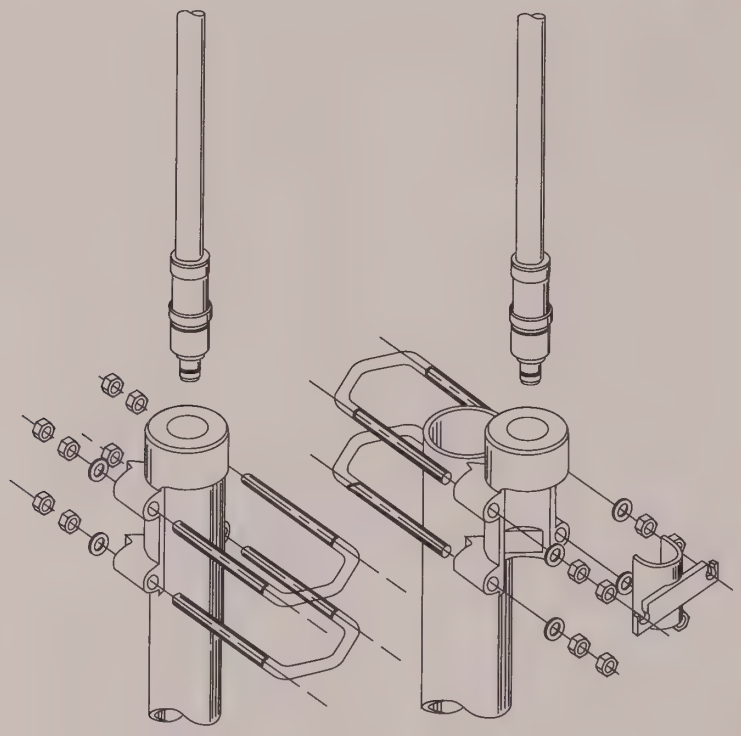
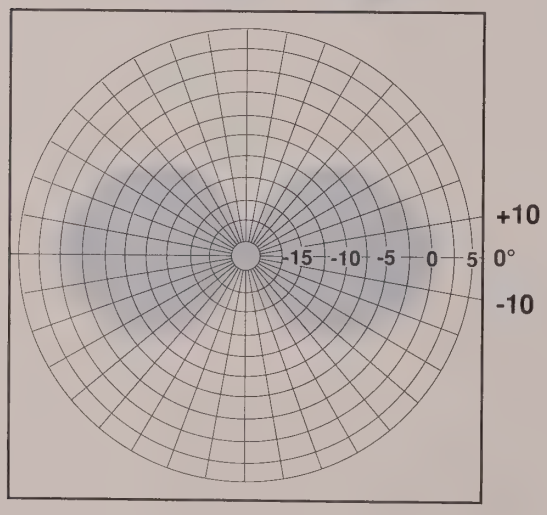
Fiberglass Omnidirectional Collinear Antennas

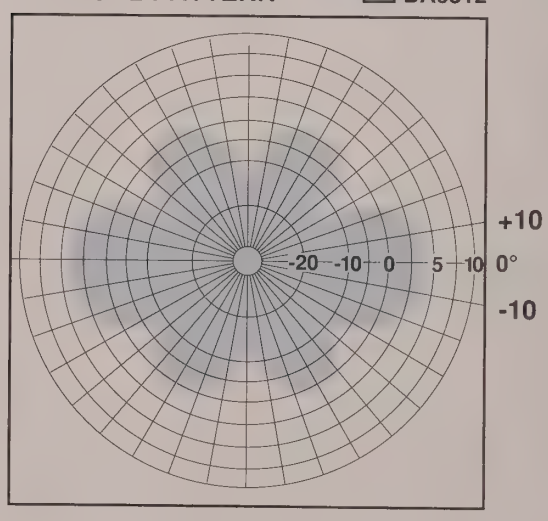


N275F Mount

VERTICAL PATTERN ☐ **BA6110**



VERTICAL PATTERN ☐ **BA6312**



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Fiberglass Omnidirectional Collinear Antennas

ELECTRICAL SPECIFICATIONS	BA6012	BA6110	BA6312
Frequency Range - MHz	449-512	406-512	449-503
Gain - dBd	Unity	Unity	3
Bandwidth - MHz for 1.5:1 VSWR	22 @ 450 MHz	70	18 @ 450 MHz
Vertical Beamwidth 1/2 Power Points	90°	66°	90°
Maximum Power Input - Watts	100	250	50
Lightning Protection	Direct Ground	Direct Ground	Direct Ground
Termination - Direct Fixed	N-female	N-female	N-female

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATION	BA6012	BA6110	BA6312
Overall Length - in. (mm)	27.6 (701)	39.4 (1001)	55.2 (1402)
Element Housing Length - in. (mm)	21.6 (549)	27.4 (696)	49.2 (1250)
Weight - lbs. (kg)	1.1 (.50)	7 (3.2)	2.9 (1.3)
Radiating Element Material	Copper Alloy	Copper Alloy	Copper Alloy
Element Housing Material	Fiberglass	Fiberglass	Fiberglass
Support Pipe Material	Aluminum	Aluminum	Aluminum
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	.12 (.01)	.65 (.06)	.25 (.024)
Rated Wind Velocity - mph (km/hr)	155 (250)	186 (300)	155 (250)
Lateral Thrust @ 100 mph - lbs. (kg)	4.8 (2.2)	26 (11.8)	10 (4.5)
Bending Moment @ 100 mph - ft./lbs. (m/kg)	5.4 (7.5)	31.2 (4.3)	15.4 (2.1)
Mounting Hardware - Supplied BA6110	Stainless steel hardware supplied permits the antenna to be mounted with feed cables running inside a support pipe 1-1/2 - 2-1/8 in. (38-54 mm) outer diameter or, with a feed cable outside a support pipe of 3/4 - 2-1/8 in. (20-58 mm) outer diameter.		
BA6012 and BA6312	N275F universal mast mount is supplied which permits antenna to be mounted with the feed cable running inside a support pipe of 1-3/8 - 1-1/2 in. (33-40 mm) outer diameter or, with a feed line running outside a support pipe of 1 - 2-1/4 in. (25-58 mm) outer diameter.		
Mounting hardware - Options BA6012 and BA6312	N280-1: 1"-14 Threaded Female Adapter PD32-5 ten ft., PD20-5 five ft. Mast Extension (Use with N280-1) N230F Clamp E179F Deck Mount (Use with N240F).		
Shipping Weight - lbs. (kg)	9 (4.08)	15.4 (6.9)	9 (4.08)
Shipping Volume - ft.^{3} (m^3)	.43 (.012)	.53 (.015)	.61 (.017)
Shipping Mode	UPS	UPS	UPS

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Fiberglass Collinear Antennas

406-512 MHz

PD201 5 dBd Stationmaster™
PD1150 5 dBd Super Stationmaster™

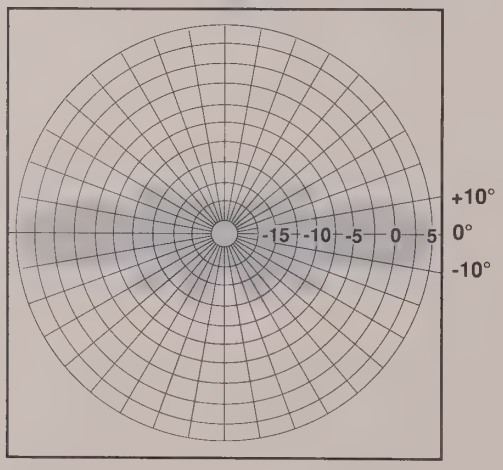
The PD201 Stationmaster Antenna is ideal for duplex or repeater systems where transmit and receive frequencies are separated by 10 MHz or less. The PD671 reflector assembly is available for the PD201. See page 62 on Special Radiation Patterns for details.

The PD1150 Super Stationmaster antenna also provides a full 10 MHz bandwidth preserving essentially the same characteristics as PD201, but with higher input power capability.

- **Fiberglass construction** — Protects radiating elements in corrosive environments.
- **DC grounded** — Affords lightning protection.
- **Copper radiating elements.** — Minimizes possibility of intermod generation.

VERTICAL PATTERN

PD201 and PD1150



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Fiberglass Collinear Antennas

ELECTRICAL SPECIFICATIONS	PD201	PD1150
Frequency Range - MHz	406-512	406-512
Gain - dBd	5	5
Bandwidth - MHz for 1.6:1 VSWR	10	10
Vertical Beamwidth 1/2 Power Points	18°	18°
Maximum Power Input - Watts	150	250
Lightning Protection	Direct Ground	Direct Ground
Termination - Direct Fixed	N-female	N-female
Flexible Extension - Supplied	18 in. (457 mm) RG8A/U Flexible Cable with N-male Connector Attached	

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD201	PD1150
Overall Length - ft. (m)	7.75 (2.36)	7.75 (2.36)
Element Housing Length - ft. (m)	6.67 (2.03)	6.67 (2.03)
Support Pipe Diameter - in. (mm)	1-5/16 (33)	2-3/8 (60)
Support Pipe Mounting Length - in. (mm)	12 (305)	12 (305)
Weight - lbs. (kg)	4 (1.81)	8 (3.64)
Radiating Element Material	Copper	Copper
Element Housing Material	Fiberglass	Fiberglass
Support Pipe Material	6061-T6 Aluminum	6061-T6 Aluminum
Wind Loading Area Flat Plate Equivalent - $ft.^2$ (m^2)	.375 (.035)	.675 (.063)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	15 (6.8)	27 (12.3)
Bending Moment 1 in. (25 mm) Below Ground Plane @ 100 mph - ft./lbs. (m/kg)	50 (6.9)	75 (10.4)
Mounting Hardware - Supplied	PD46 Clamp Set	PD46 Clamp Set
Mounting Hardware - Optional	PD241 Wall Mount PD246 Pole Mount PD402 Side Mount (Short) PD403 Side Mount (Long)	PD241 Wall Mount PD246 Pole Mount PD302 Side Mount (Short) PD303 Side Mount (Long)
Shipping Weight - lbs. (kg)	19 (8.62)	25 (11.34)
Shipping Volume - $ft.^3$ (m^3)	0.7 (.02)	1.0 (.03)
Shipping Mode	450-512 MHz (UPS), 406-450 MHz (Common Carrier)	

Ordering Information

Item Number		Frequency Range - MHz
PD201-1	PD1150-1	406-413
PD201-2	PD1150-2	412-420
PD201-3	PD1150-3	420-430
PD201-4	PD1150-4	430-440
PD201-5	PD1150-5	440-450
PD201-6	PD1150-6	450-460
PD201-7	PD1150-7	460-470
PD201-8	PD1150-8	470-482
PD201-9	PD1150-9	482-494
PD201-10	PD1150-10	494-506
PD201-11	PD1150-11	500-512

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Fiberglass Collinear Antennas

406-512 MHz

PD400	**7.5 dBd Stationmaster™ Antenna**
PD1151	**8.0 dBd Super Stationmaster™ Antenna**

These fiberglass enclosed antennas offer significant advantages over most exposed element arrays and deliver equal or better electrical performance.

Super Stationmaster Antennas employ multiple, large diameter copper radiating elements stacked collinearly, fed in phase and enclosed in a weatherproof fiberglass housing. These DC grounded units use low loss Teflon® insulated connectors and their flexible extension cable is equipped with a weather shielded Type N male connector. The Super Stationmaster provides 8.0 dBd gain and a full 10 MHz bandwidth.

The Stationmaster provides 7.5 dBd omnidirectional gain and can withstand winds of 125 mph (200 km/hr). It is excellent for duplex systems with 8 MHz or less separation between Tx and Rx frequencies.

Several mounting hardware options and special reflector assembly kits are available for both these antennas. See page 62 for more information.

- **Weatherproof design** — Assures system reliability, withstands winds of 125 mph.
- **Copper elements** — Minimizes possibility of intermod generation.
- **DC grounded** — Protects against damage from lightning strikes.

Ordering Information

Item Number	Frequency Range - MHz	Item Number	Frequency Range - MHz
PD400-1	406-412	PD1151-1	406-420
PD400-1A	412-420	PD1151-2	440-450
PD400-1B	420-430	PD1151-3	450-460
PD400-1C	430-440	PD1151-4	460-470
PD400-2	440-450	PD1151-5	470-482
PD400-3	450-460	PD1151-6	482-494
PD400-4	460-470	PD1151-7	494-506
PD400-5	470-480	PD1151-8	500-512
PD400-6	480-490		
PD400-7	490-500		
PD400-8	500-512		

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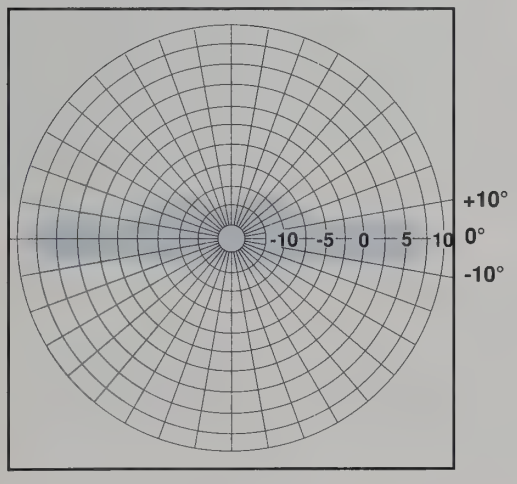
Fiberglass Collinear Antennas

ELECTRICAL SPECIFICATIONS	PD400	PD1151
Frequency Range - MHz	406-512	406-512
Gain - dBd	7.5	8.0
Bandwidth - MHz for 1.5:1 VSWR	8.0	10.0
Vertical Beamwidth 1/2 Power Point	12°	12°
Maximum Power Input - Watts	150	250
Lightning Protection	Direct Ground	Direct Ground
Termination - Direct Fixed	UHF-female	N-female
Flexible Extension - Supplied	18 in. (457 mm) RG8A/U Flexible Cable with N-male Connector Attached	

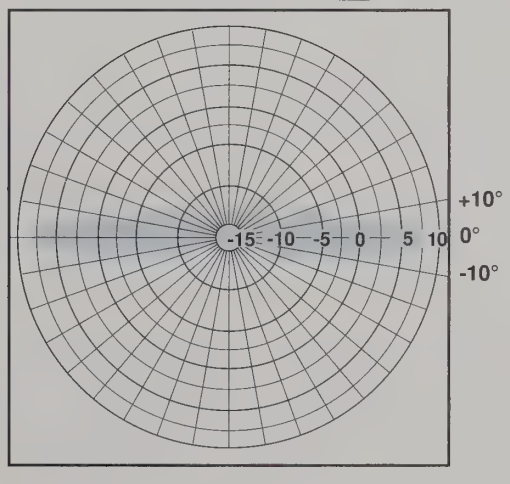
Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD400	PD1151
Overall Length - in. (mm)	13.2 (4.02)	17.2 (5.24)
Element Housing Length - ft. (m)	11 (3.35)	15 (4.57)
Support Pipe Diameter - in. (mm)	2-3/8 (60)	2-3/4 (70)
Support Pipe Mounting Length - in. (mm)	24 (610)	24 (610)
Weight - lbs. (kg)	17 (7.71)	20 (9.07)
Radiating Element Material	Copper	Copper
Element Housing Material	Fiberglass	Fiberglass
Support Pipe Material	6061-T6 Aluminum Pipe	6061-T6 Aluminum Pipe
Wind Loading Area Flat Plate Equivalent - $ft.^3$ (m^3)	.88 (.082)	1.17 (.109)
Rated Wind Velocity - mph (km/hr)	125 (201)	125 (201)
Lateral Thrust @ 100 mph - lbs. (kg)	35.5 (16)	46.8 (21.2)
Bending Moment 1 in. (25mm) Below Ground Plane @ 100 mph - ft./lbs. (m/kg)	192 (26.6)	236.8 (32.7)
Mounting Hardware - Supplied	PD46 Clamp Set	PD46 Clamp Set
Mounting Hardware - Optional	PD241 Wall Mount PD246 Pole Mount PD302 Side Mount (Short) PD303 Side Mount (Long)	PD241 Wall Mount PD246 Pole Mount PD556 Side Mount (Short) PD503 Side Mount (Long)
Shipping Weight - lbs. (kg)	37 (16.8)	45 (20.4)
Shipping Volume - $ft.^3$ (m^3)	1.8 (.051)	2.0 (.06)
Shipping Mode	Common Carrier	Common Carrier

VERTICAL PATTERN ☐ PD1151



VERTICAL PATTERN ☐ PD400



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Fiberglass Broadband Antenna

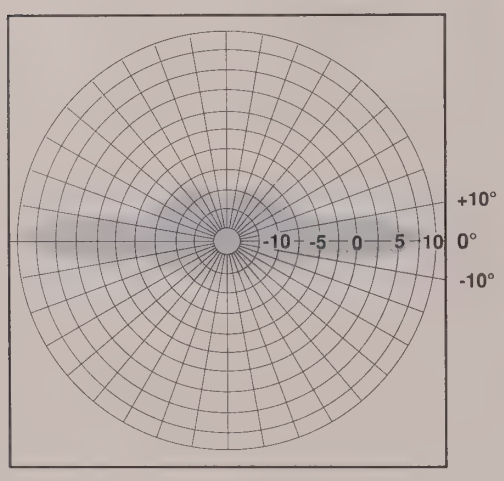
406-512 MHz

PD458 — 8.0 dBd Storm Chief™ Ruggedized Broadband

The PD458 is designed for use in areas where electrical storms are highly prevalent. An exposed lightning spike at the top of the antenna is directly connected to the support pipe by means of a 7/8 in. (22 mm) O.D. high conductivity copper conductor. In laboratory conditions, the PD458 has been directly subjected to 190 kiloamps without effect on performance. The radiating system of this antenna consists of six 1/2 wave elements mounted coaxially. The copper 7/8 in. (22 mm) diameter feed line shunt feeds each center grounded element. For a power rating of up to 1000 Watts this antenna can be modified with a fitting which will accept 7/8 in. (22 mm) diameter 50 Ohm cable directly. *Specify PD458K for the high power version. A reflector assembly is available. See page 62 for more information. Specify PD10000.*

- **Robust DC grounding** — Protects against damage from lightning strikes.
- **Broad bandwidth** — Fewer models to cover the band.
- **High power capability** — For multiple high power combined applications.

VERTICAL PATTERN ☐ PD458



Ordering Information

Item Number		Frequency Range - MHz
Standard	High Power	
PD458-1	PD458K-1	406-420
PD458-2	PD458K-2	450-470
PD458-3	PD458K-3	470-494
PD458-4	PD458K-4	488-512

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Fiberglass Broadband Antenna

ELECTRICAL SPECIFICATIONS	PD458			
Frequency Range - MHz	406-512			
Gain - dBd	8			
Standard Bandwidths - MHz	406-420	450-470	470-494	488-512
Bandwidth - MHz for 1.5:1 VSWR	14	20	24	24
Vertical Beamwidth 1/2 Power Points	12°	12°	12°	12°
Maximum Power Input - Watts	250 (PD458K: 1000 Watts)			
Lightning Protection	Direct Ground			
Termination - Direct Fixed	N-female (PD458K: 50 Ohms 7/8 in. (22 mm) EIA Flange)			
Flexible Extension - Supplied	18 in. (457mm) RG8A/U Flexible Cable w/N-male Connector Attached (PD458K, None)			

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD458			
Standard Bandwidths - MHz	406-420	450-470	470-494	488-512
Overall Length - in. (mm)	14.8 (4.51)	13.6 (4.15)	12.7 (3.87)	12.6 (3.84)
Element Housing Length - ft. (m)	12.5 (3.81	11.3 (3.43)	10.4 (3.18)	10.3 (3.12)
Support Pipe Diameter - in. (mm)	2-3/4 (70)	2-3/4 (70)	2-3/4 (70)	2-3/4 (70)
Support Pipe Mounting Length - in. (mm)	24 (610)	24 (610)	24 (610)	24 (610)
Weight - lbs. (kg)	24 (10.9)	22 (10.0)	21 (9.55)	21 (9.55)
Radiating Element Material	2 in. (50.8 mm) Diameter Brass Tube			
Element Housing Material	2-3/8 in. (60.3 mm) Diameter Fiberglass Radome			
Support Pipe Material	6061-T6 Aluminum Pipe			
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	2.55 (.237)	2.25 (.209)	2.13 (.198)	2.05 (.191)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	102 (46.4)	90 (40.9)	85 (38.6)	82 (37.3)
Bending Moment 1 in. (25 mm) Below Top of Support Pipe @ 100 mph - ft./lbs. (m/kg)	590 (82)	450 (62)	400 (55)	380 (53)
Mounting Hardware - Supplied	PD46 Clamp Set			
Mounting Hardware - Optional		PD241 Wall Mount PD246 Pole Mount	PD10024 Side Mount (Short) PD10028 Side Mount (Long)	
Shipping Weight - lbs. (kg)	48 (21.8)	46 (20.9)	45 (20.4)	45 (20.4)
Shipping Volume - ft.^{3} (m^3)	2.8 (.08)	2.75 (.077)	2.65 (.075)	2.6 (.073)
Shipping Mode	Common Carrier			

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Fiberglass Collinear Antennas

406-512 MHz

PD455 — **10 dBd Super Stationmaster™**

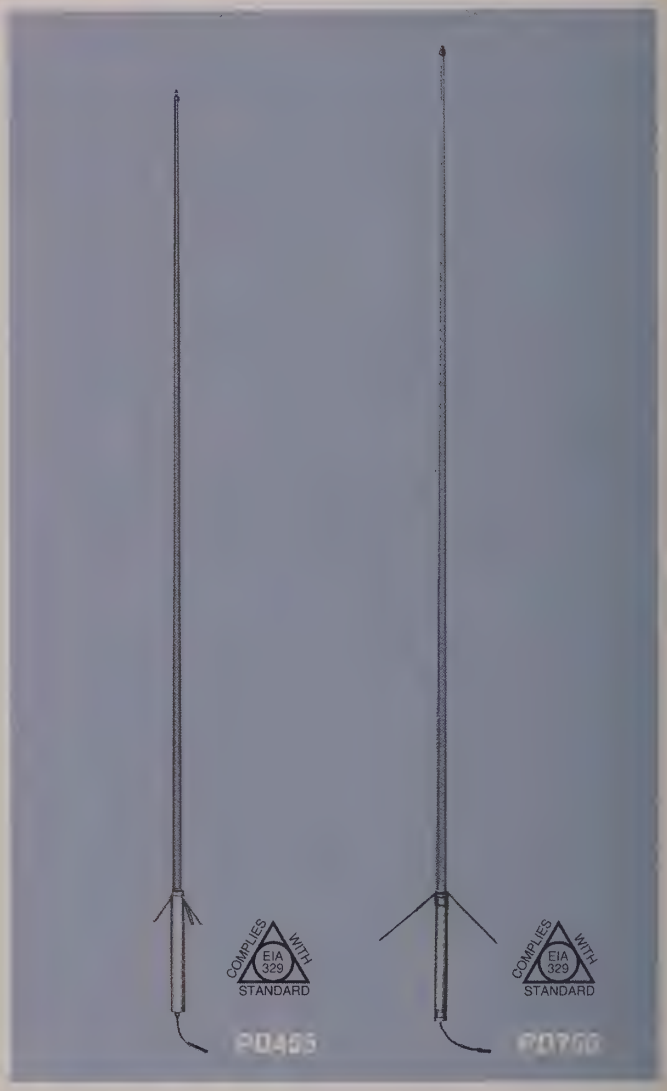
PD755 — **10 dBd Heavy Duty Super Stationmaster™**

These Super Stationmaster UHF base station antennas incorporate design enhancements not normally available in other fiberglass collinear antennas of comparable size. Due to their broadband characteristics, only six versions are required to cover the 450-512 MHz band.

The PD455 combines full 10 MHz bandwidth capability and improved lightning protection with 10 dBd omni-directional gain while preserving the desirable light-weight characteristic found in all Stationmaster antennas. The PD755 is electrically equivalent to the PD455 but represents an extra rugged version with specially strengthened housing and support pipe. It is designed for use in very severe weather environments. The PD568 reflector assembly is available for the PD455. See page 62 on Special Radiation Patterns for details.

The PD455DT and PD755DT may be ordered with either 3° or 6° downtilt. Note: Operational gain and bandwidth are lessened with downtilt to 9.5 dBd and 8 MHz bandwidth.

• **Fiberglass construction**	Protects radiating elements in corrosive environments.
• **Copper radiating elements**	Minimizes possibility of intermod generation.
• **Full 10 dB gain**	Provides maximum on horizon coverage.



Ordering Information (Specify DT for Downtilt Option)

Item Number	Frequency Range - MHz	Item Number	Frequency Range - MHz
PD455-1	406-413	PD755-1	406-413
PD455-2	412-420	PD755-2	412-420
PD455-3	420-430	PD755-3	420-430
PD455-4	430-440	PD755-4	430-440
PD455-5	440-450	PD755-5	440-450
PD455-6	450-460	PD755-6	450-460
PD455-7	460-470	PD755-7	460-470
PD455-8	470-482	PD755-8	470-482
PD455-9	480-490	PD755-9	482-494
PD455-10	494-506	PD755-10	494-506
PD455-11	500-512	PD755-11	500-512

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Fiberglass Collinear Antennas

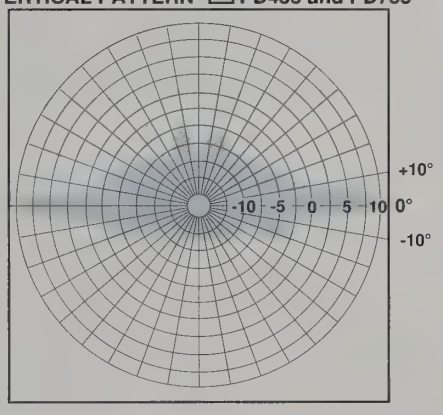
ELECTRICAL SPECIFICATIONS	PD455	PD455DT	PD755	PD755DT
Frequency Range - MHz	406-512	406-512	406-512	406-512
Gain - dBd	10	9.5	10	9.5
Bandwidth - MHz for 1.5:1 VSWR	10	8	10	8
Vertical Beamwidth 1/2 Power Points	7°	7°	7°	7°
Maximum Power Input - Watts	250	250	250	250
Lightning Protection	Direct Ground	Direct Ground	Direct Ground	Direct Ground
Termination - Direct Fixed	N-female	N-female	N-female	N-female
Flexible Extension - Supplied	18 in. (457mm) RG8A/U Flexible Cable with N-male Connector Attached			

Note: All VSWR data referenced to 50 Ohms.

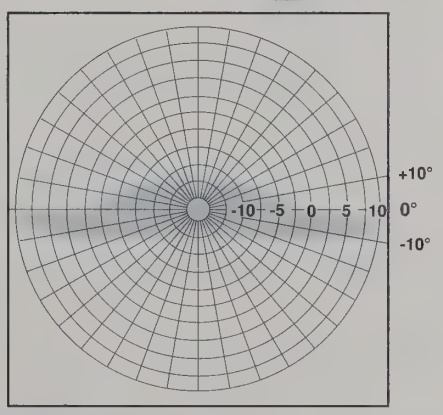
MECHANICAL SPECIFICATIONS	PD455	PD455DT	PD755	PD755DT
Overall Length - ft. (m)	22 (6.71)	22 (6.71)	23 (7.01)	23 (7.01)
Element Housing Length - ft. (m)	20 (6.10)	20 (6.10)	20 (6.10)	20 (6.10)
Support Pipe Diameter - in. (mm)	2-3/4 (69.8)	2-3/4 (69.8)	3-1/2 (88.9)	3-1/2 (88.9)
Support Pipe Mounting Length - in. (mm)	24 (610)	24 (610)	34 (864)	34 (864)
Weight - lbs. (kg)	23 (10.4)	23 (10.4)	53 (24.0)	53 (24.0)
Radiating Element Material	Copper	Copper	Copper	Copper
Element Housing Material	Fiberglass	Fiberglass	Fiberglass	Fiberglass
Support Pipe Material	6061-T Aluminum Pipe	6061-T Aluminum Pipe	6061-T Aluminum Pipe	6061-T Aluminum Pipe
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	1.98 (.184)	1.98 (.184)	2.37 (.220)	2.37 (.220)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)	175 (282)	175 (282)
Rated Wind Velocity with 1/2 in. (13mm) of Radial Ice - mph (km/hr)	85 (137)	85 (137)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	79 (35.9)	79 (35.9)	94.8 (43)	94.8 (43)
Bending Moment 1 in. (25mm) Below Ground Plane @ 100 mph (161 km/hr) with No Ice - ft./lbs. (m/kg)	521 (72)	521 (72)	850 (118)	850 (118)
Mounting Hardware - Supplied	PD46 Clamp Set	PD46 Clamp Set	PD346 Heavy Duty Clamp Set	PD346 Heavy Duty Clamp Set
Mounting Hardware - Optional	PD241 Wall Mount, PD246 Pole Mount PD556 Side Mount (Short), PD503 Side Mount (Long)		PD561 Side Mount (Long) Note: Recommend using PD455 when side mounting	
Shipping Weight - lbs. (kg)	58 (26.3)	58 (26.3)	106 (48.1)	106 (48.1)
Shipping Volume - ft.³ (m³)*	2.7 (.08)	2.7 (.08)	5.6 (.16)	5.6 (.16)
Shipping Mode	Common Carrier	Common Carrier	Common Carrier	Common Carrier

***Note:** The maximum overall length of the shipping container is 24 ft. (7.3 meters).

VERTICAL PATTERN ☐ PD455 and PD755



VERTICAL PATTERN ☐ PD455DT



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Single and Dual Yagi Antennas

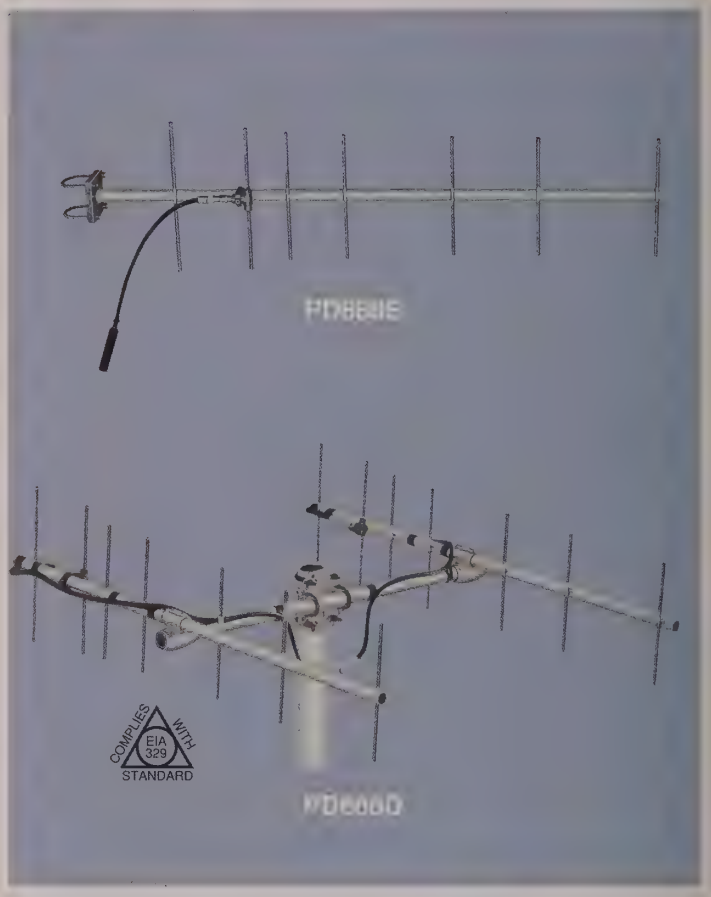
406-512 MHz

PD688S	**10 dBd Gain, 7 Element Single Yagi**
PD688D	**13 dBd Gain, 14 Element Dual Yagi**

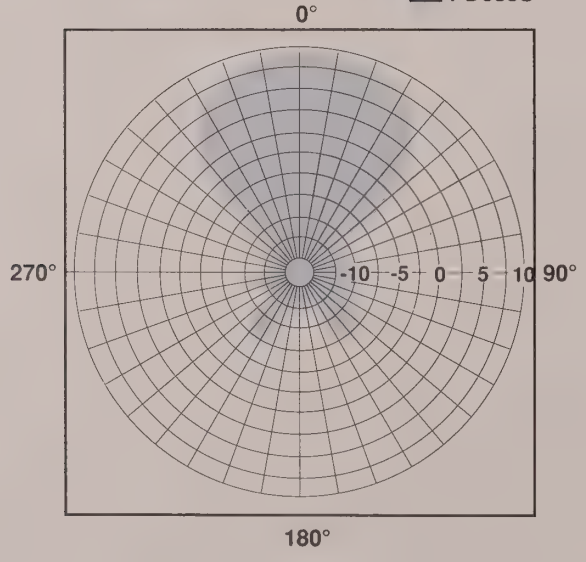
These Yagi Antennas are constructed using 6061-T6 aluminum rod and pipe. Solid director and solid reflector elements are precision welded to their main boom effectively eliminating misalignment problems during shipping, installation or in service. Provision has been made in the mounting hardware for either vertical or horizontal polarization and stacking.

Ordering Information

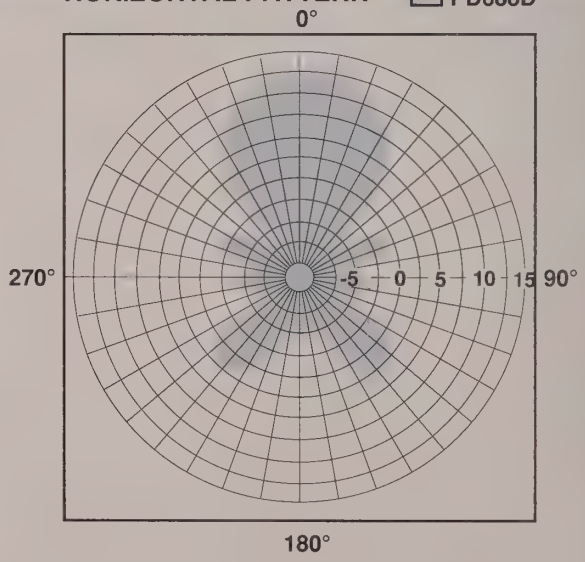
Item Number		Freq. Range - MHz
PD688S-1	PD688D-1	406-420
PD688S-2	PD688D-2	420-440
PD688S-3	PD688D-3	450-470
PD688S-4	PD688D-4	470-494
PD688S-5	PD688D-5	494-512



HORIZONTAL PATTERN ☐ PD688S



HORIZONTAL PATTERN ☐ PD688D



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Single and Dual Yagi Antennas

ELECTRICAL SPECIFICATIONS	PD688S	PD688D
Frequency Range - MHz	406-512	406-512
Gain - dBd	10	13
Bandwidth - MHz for 1.5:1 VSWR	20	20
Horizontal Beamwidth 1/2 Power Points	50°	24°
Vertical Beamwidth 1/2 Power Points	40°	40°
Maximum Power Input - Watts	250	250
Front-To-Back Ratio - dBd	15 (min.)	15 (min.)
Lightning Protection	Direct Ground	Direct Ground
Termination - Direct Flexible	18 in. (457 mm) RG8A/U Fexible Cable with N-male Connector Attached	

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD688S	PD688D
Maximum Element Length - in. (mm) @ 450 MHz	13.4 (340)	13.4 (340)
Element Support Length - in. (mm) @ 450 MHz	50 (1270)	43.5 (1105)
Antenna Separation - in. (mm)	N/A	33 (838)
Weight - lbs. (kg)	3.75 (1.70)	8 (3.64)
Element Material	3/8 in. (10 mm) Diameter 6061-T6 Aluminum Rod	
Element Support Material	1-1/16 in. (27 mm) Diameter 6061-T6 Aluminum Pipe	
Wind Loading Area Flat Plate Equivalent - $ft.^2(m^2)$	0.35 (.033)	0.75 (.070)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	14 (6.4)	30 (13.6)
Torsional Moment @ 100 mph with Standard Mounting - ft./lbs. (m/kg)	24.5 (3.4)	N/A
Mounting Hardware - Supplied	U Bolts 5/16 in. (8 mm) ID	PD237 Crossover Plate
Shipping Weight - lbs. (kg)	8 (3.63)	18 (8.16)
Shipping Volume - $ft.^3$ (m^3)	3.2 (.1)	6.2 (.2)
Shipping Mode	UPS	UPS

Panel Directional Antennas

400-520 MHz

PD10054 **7.3 dBd Gain**
PD10055 **10.0 dBd Gain**

These single and dual panel directional antennas are designed to eliminate many problems inherent with side mounted exposed dipole antennas.

These antennas feature high front-to-back ratio making them nearly impervious to tower changes that would alter the pattern of the antenna. They are not phase critical with tower members. They can be positioned where they mechanically fit and mounted back-to-back to provide dual system coverage from the same tower with only 30% more windloading.

In addition, these units are less subject to damage from low amplitude and proximity lightning strikes, can be used in any climate and withstand icing, salt air and acid rain.

- **Weather resistant radome** — Withstands icing, salt air and acid rain.
- **High front-to-back ratio** — Provides isolation from adjacent systems.
- **Shielded element** — Protects against damage from low amplitude and proximity lightning strikes.
- **Low profile** — Aesthetically pleasing, can be painted to blend with architecture.*
- **Pattern flexability** — Can be arrayed for gain or quiet zone.

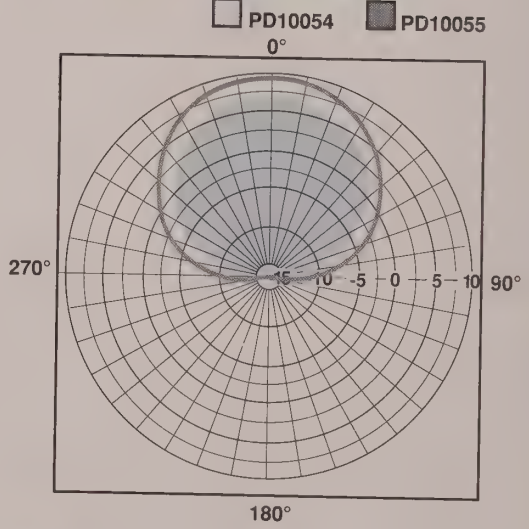
*Contact Sales Engineering for painting instructions.

Ordering Information

Item Number		Freq. Range - MHz
PD10054-1	PD10055-1	400-440
PD10054-2	PD10055-2	420-460
PD10054-3	PD10055-3	440-480
PD10054-4	PD10055-4	460-500
PD10054-5	PD10055-5	480-520

Patents Pending

HORIZONTAL PATTERN



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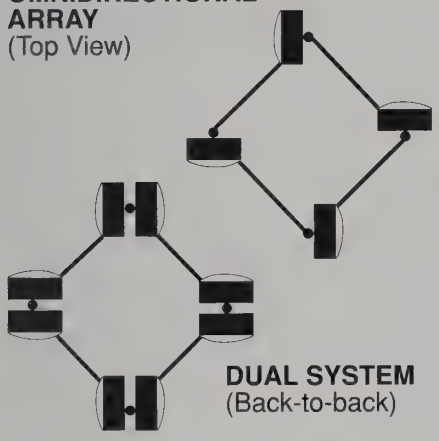
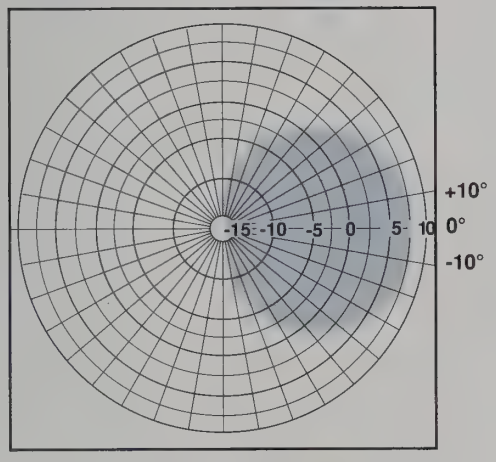
Panel Directional Antennas

OMNIDIRECTIONAL ARRAY
(Top View)

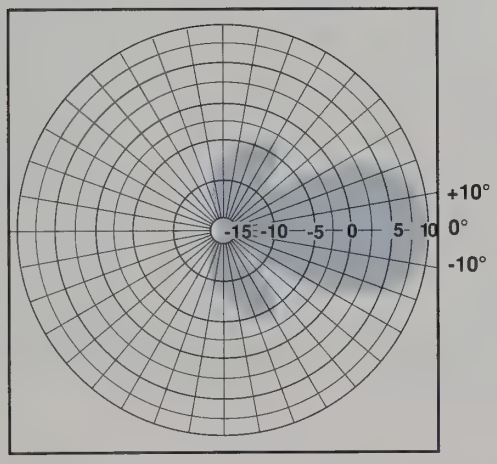


DUAL SYSTEM
(Back-to-back)

VERTICAL PATTERN ☐ **PD10054**



VERTICAL PATTERN ☐ **PD10055**



ELECTRICAL SPECIFICATIONS	PD10054	PD10055
Frequency Range - MHz	400-520	400-520
Gain - dBd	7.3	10.0
Bandwidth - MHz for 1.5:1 VSWR	40	40
Horizontal Beamwidth 1/2 Power Points	65°	65°
Vertical Beamwidth 1/2 Power Points	65°	35°
Maximum Power Input - Watts	250	250
Front-to-Back Ratio - dBd	25 (30 Typical)	
Lightning Protection	Direct Ground	
Termination - Direct Fixed	N-female	

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD10054	PD10055
Width - in. (mm)	20-1/8 (511)	20-1/8 (511)
Height - in. (mm)	20-1/8 (511)	40 (1015)
Depth - in. (mm)	9-7/8 (251)	9-7/8 (251)
Weight - lbs. (kg)	18 (8.16)	28 (12.7)
Radiating Element Material	Copper Alloy	
Radome Material	Weather Resistant Plastic	
Reflector Material	5052-H32 Aluminum (Iridite Treated)	
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	2.81 (.26)	5.6 (.52)
Rated Wind Velocity - mph (km/hr)	100 (161)	
Lateral Thrust @ 100 mph - lbs. (kg)	112 (51)	224 (102)
Torsional Moment @ 100 mph with Std. Mounting - ft./lbs. (m/kg)	34.5 (4.8)	68.6 (9.5)
Mounting Hardware - Supplied	PD1253 Clamp Set fits 1-3/4 in. (44 mm) to 4 in. (102 mm) diameter pipe	
Shipping Weight - lbs. (kg)	40 (18.1)	60 (27.2)
Shipping Volume - ft.^{3} (m^3)	7.0 (.19)	12.5 (.35)
Shipping Mode	UPS	Common Carrier or UPS

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Microcell Sector Antenna

824-894 MHz

PD10085L - "The Localizer"™

This 8 dBd gain, 60 degree directional panel antenna features a 25 degree downtilt for signal saturation and a 30 dBd null on horizontal to provide maximum "splash" protection. It has been specially designed to exceed the performance of traditional directional antennas. Its high, front-to-back ratio effectively isolates interference from adjacent cells and is nearly impervious to tower changes. Because its elements are almost completely shielded within the grounded reflector, "The Localizer" is less susceptible to damage from low amplitude and proximity lightning strikes. A weather resistant radome ensures the antenna's use in all climates and hostile environmental conditions.

- **Extreme downtilt** — Localizes energy in MSA or microcells to prevent overlap into adjacent cells.
- **High front-to-back ratio** — Effectively isolates signals from adjacent cells.
- **Weather resistant radome** — Minimizes corrosion, assures reliable operation in icing, salt air and acid rain conditions.
- **Shielded elements** — Less susceptible to damage from low amplitude lightning.
- **Unobtrusive** — Easily blends with architecture, can be painted to match.*

* Contact our Sales Engineering department for special painting instructions.

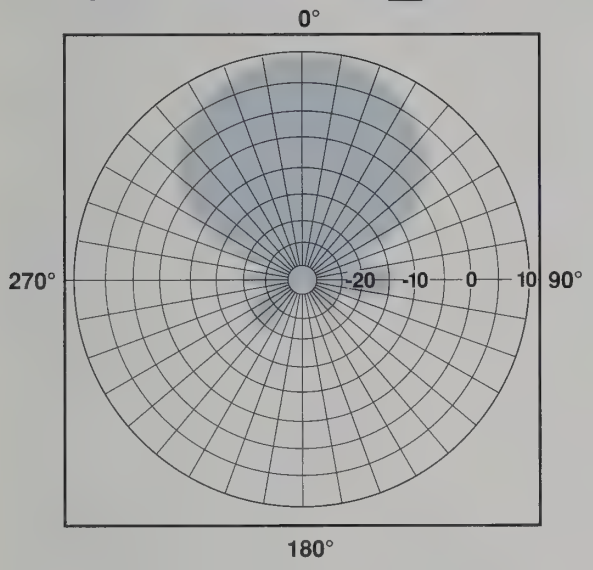
Patents Pending

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

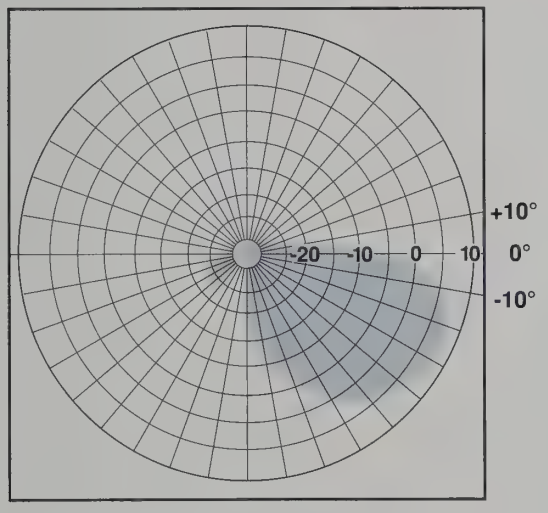
Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Microcell Sector Antenna

HORIZONTAL PATTERN ☐ **PD10085L**



VERTICAL PATTERN ☐ **PD10085L**



ELECTRICAL SPECIFICATIONS	PD10085L
Frequency Range - MHz	824-894
Gain - dBd	8
Bandwidth - MHz for 1.5:1 VSWR	824-894
Horizontal Beamwidth 1/2 Power Points	60°
Vertical Beamwidth 1/2 Power Points	35°
Maximum Power Input - Watts	250
Front-To-Back Ratio - dBd	25 (30 Typical)
Lightning Protection	Direct Ground
Termination - Direct	N-female
Downtilt	25°

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD10085L
Width - in. (mm)	10-3/8 (264)
Height - in. (mm)	20 (508)
Depth - in. (mm)	5 (127)
Weight - lbs. (kg)	10 (4.5)
Radiating Element Material	6061-T6 Aluminum Alloy
Radome Material	Weather-Resistant Plastic
Reflector Material	5052-H32 Irridited Aluminum
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	1.44 (.134)
Rated Wind Velocity - mph (km/hr)	100 (161)
Lateral Thrust at Rated Wind - lbs. (kg)	58 (26.2)
Torsional Moment at Rated Wind w/std. Mounting - ft./lbs. (m/kg)	11.6 (1.6)
Mounting Hardware - Supplied	PD1253 Clamp Set, Fits Round Pipe, 1-3/4 in. (44 mm) to 4 in. (102 mm) Outer Diameter (Pipe Not Included)
Shipping Weight - lbs. (kg)	18 (8.2)
Shipping Volume - ft.^{3} (m^3)	2 (.06)
Shipping Mode	UPS

Note: Forward gain on the horizon is -25 dB.

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Wideband Sector Antennas

806-960 MHz

PD10175	**AMPS/TACS**
PD10177	**AMPS**
PD10178	**TACS**

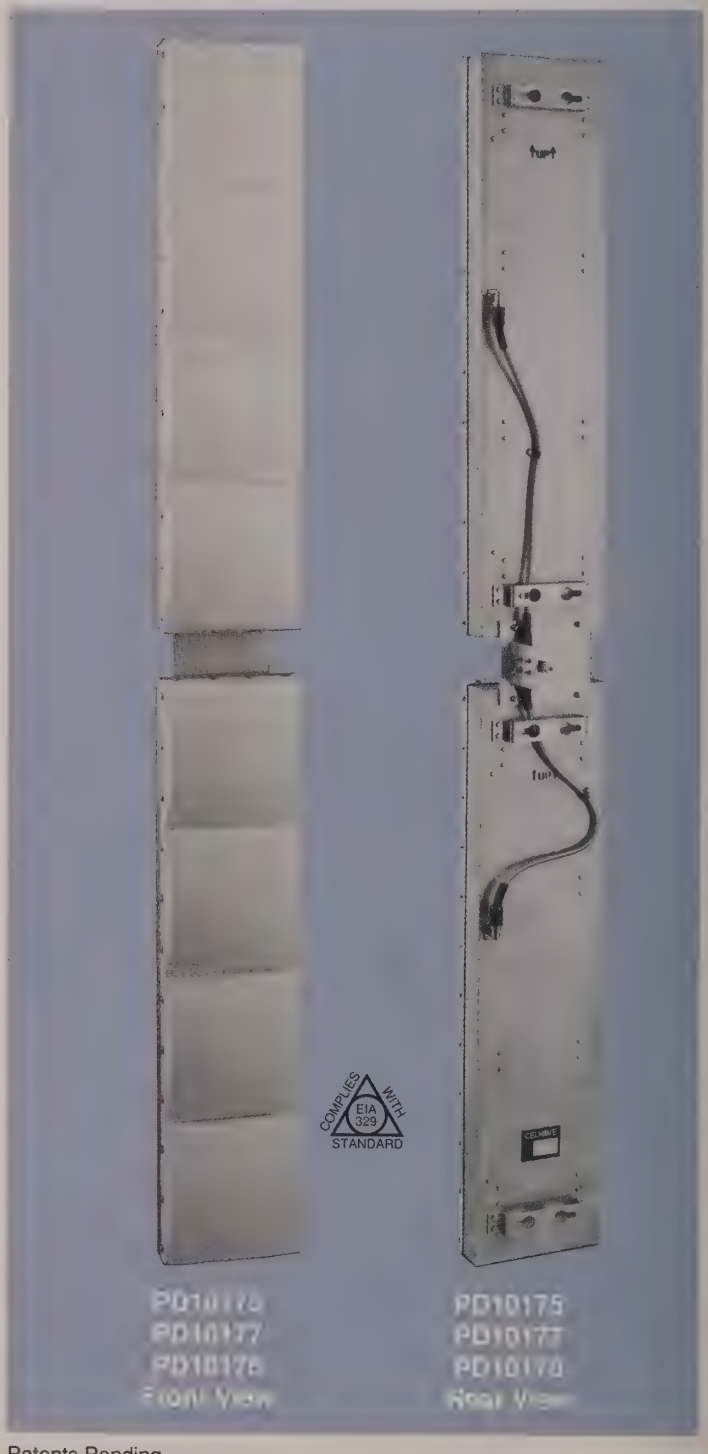
These 16 dBd gain, 62 degree directional panel antennas are designed to serve AMPS, TACS, and combined AMPS/TACS applications equally well. The PD10175 covers 806-960 MHz, the PD10177 824-894 MHz and the PD10178 890-960 MHz. All antennas include a side-fed dipole design and low-loss strip-line feed system. All of the aluminum alloy components are irridited for corrosion resistance. All screws are stainless steel and are lock-tited in place. A high impact, low-loss radome protects the radiating elements from ice, rain and caustic environments. *Options include 1000 Watt input capability and electrical downtilt. UPS shippable if ordered unassembled, support pipe option "H".*

- **Low profile** — Architecturally pleasing, can be painted to blend with building.*
- **Weathertight radome** — Protects elements and feed system from hostile environments and minimizes pattern distortion due to ice buildup.
- **Irridited reflector** — Reduces interference and inhibits corrosion.

*Contact our Sales Engineering department for painting instructions.

Ordering Information

Item Number		Frequency
Standard	**w/Support Pipe**	**Range - MHz**
PD10175	PD10175H	806-960
PD10177	PD10177H	824-894
PD10178	PD10178H	890-960



Patents Pending

CELWAVE RFS
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Wideband Sector Antennas

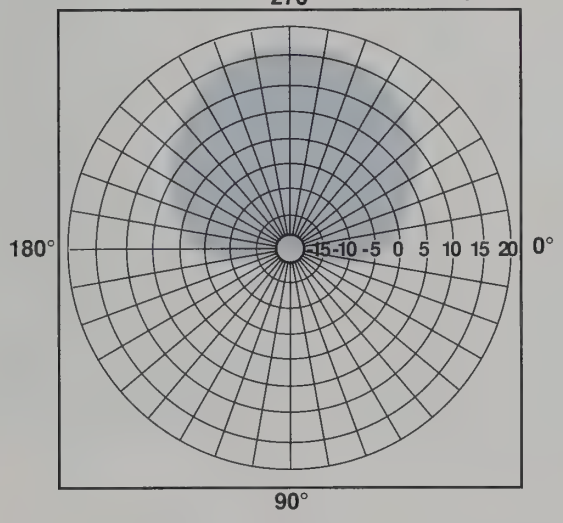
ELECTRICAL SPECIFICATIONS	PD10175	PD10177	PD10178
Frequency Range - MHz	806-960	824-894	890-960
Gain - dBd	16	16	16
Bandwidth - MHz for 1.5:1 VSWR	154 min.	70 min.	70 min.
Horizontal Beamwidth 1/2 Power Points	62°	62°	62°
Vertical Beamwidth 1/2 Power Points	8°	8°	8°
Maximum Power Input - Watts	500	500	500
Front-to-Back Ratio - dBd	25 (30 Typical)	25 (30 Typical)	25 (30 Typical)
Lightning Protection	Direct Ground	Direct Ground	Direct Ground
Termination - Direct	N-female	N-female	N-female

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD10175	PD10177	PD10178
Width - in. (mm)	10-3/8 (264)	10-3/8 (264)	10-3/8 (264)
Height - in. (mm)	86 (2184)	86 (2184)	86 (2184)
Depth - in. (mm)	5 (127)	5 (127)	5 (127)
Weight - lbs. (kg)	43 (17.3)	43 (17.3)	43 (17.3)
Radiating Element Material	Irridited Aluminum Alloy	Irridited Aluminum Alloy	Irridited Aluminum Alloy
Radome Material	Weather-Resistant Plastic	Weather-Resistant Plastic	Weather-Resistant Plastic
Reflector Material	5052-H32 Irridited Aluminum	5052-H32 Irridited Aluminum	5052-H32 Irridited Aluminum
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	6.2 (0.58)	6.2 (0.58)	6.2 (0.58)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	248 (112.5)	248 (112.5)	248 (112.5)
Torsional Moment @ 100 mph with Standard Mounting - ft./lbs (m/kg)	50 (6.9)	50 (6.9)	50 (6.9)
Mounting Hardware - Supplied Standard Option H	PD1253 Clamp Set – Fits Support Pipe 1-3/4 in. (44 mm) to 4 in. (102 mm) Outer Diameter. Supplied with 2-3/8 in. Aluminum Support Pipe and PD46 Clamp Set.		
Shipping Mode	Common Carrier or UPS (Must Specify "Unassembled")		

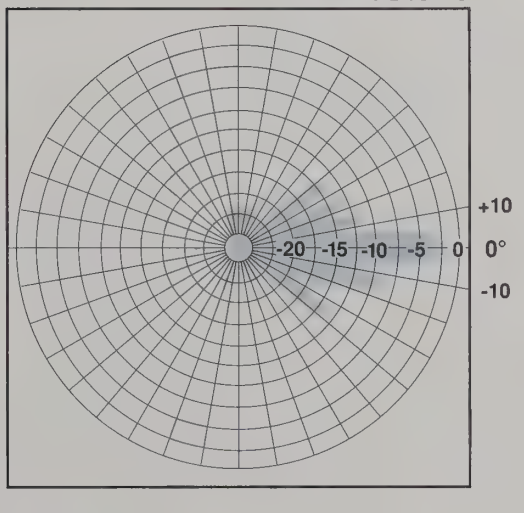
HORIZONTAL PATTERN

PD10175
PD10177
PD10178



VERTICAL PATTERN

PD10175
PD10177
PD10178



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Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Wideband 120° Sector Antennas

820-960 MHz

PD10188 10.5 dBd Gain AMPS/TACS
PD10189 13.5 dBd Gain AMPS/TACS

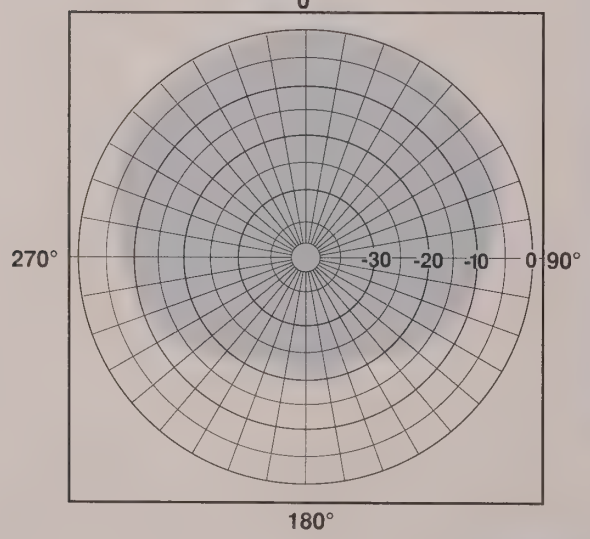
These panel antennas have been specifically designed for low density, three sector AMPS/TACS cell sites and where AMPS/TACS/GSM systems are combined into a single antenna. Their wide bandwidth allows their use for transmit, receive and full duplex applications. Both feature a side-fed dipole design and low loss air dielectric strip-line feed. All aluminum alloy components are irridited and all screws are double secured stainless steel to eliminate non-linear joints. A high impact, low loss, UV stabilized radome protects radiating elements from environmental hazards.

- **Slim profile** — Aesthetically pleasing, can be painted to blend with architecture.*
- **Weathertight radome** — Protects radiating elements from environment, minimizes pattern distortion due to ice build-up.
- **Irridited components** — Inhibits corrosion.

*Contact our Sales Engineering department for painting instructions.

HORIZONTAL PATTERN

PD10188 and PD10189



Patents Pending

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

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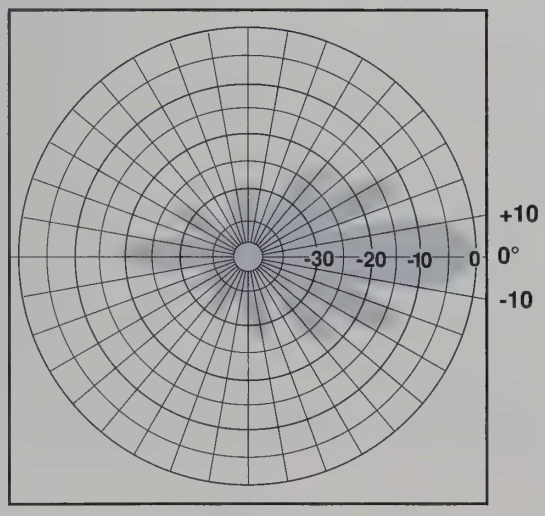
Wideband 120° Sector Antennas

ELECTRICAL SPECIFICATIONS	PD10188	PD10189
Frequency Range - MHz	820-960	820-960
Gain - dBd	10.5	13.5
Bandwidth - MHz for 1.5:1 VSWR	140	140
Horizontal Beamwidth 1/2 Power Points	120°	120°
Vertical Beamwidth 1/2 Power Points	14°	7°
Maximum Power Input - Watts	500	500
Front-to-Back Ratio - dBd	20	20
Lighting Protection	Direct Ground	Direct Ground
Termination - Direct	N-female	N-female

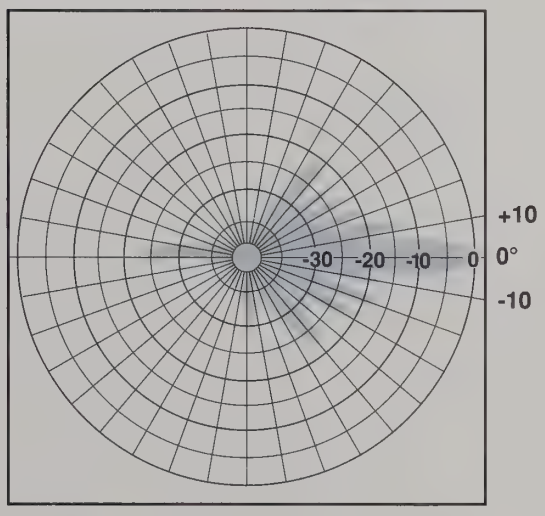
Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD10188	PD10189
Width - in. (mm)	7.625 (194)	7.625 (194)
Height - in. (mm)	48.5 (1232)	98 (2489)
Depth - in. (mm)	5.0 (127)	5.0 (127)
Weight - lbs. (kg)	22 (10)	46 (20.8)
Radiating Element Material	Irridited Aluminum Alloy	Irridited Aluminum Alloy
Radome Material	UV Stabilized High Impact ABS Plastic	UV Stabilized High Impact ABS Plastic
Reflector Material	5052-H32 Irridited Aluminum	5052-H32 Irridited Aluminum
Wind Loading Area Flat Plate Equivalent - ft.² (m^2)	2.57 (.239)	5.19 (.482)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)
Lateral Thrust at 100 mph - lbs. (kg)	68.5 (31.1)	138.4 (62.8)
Torsional Moment at 100 mph w/std. Mounting - ft./lbs (m/kg)	15.87 (2.19)	32.06 (4.43)
Mounting Hardware - Supplied	PD1253 Clamp Set Fits Support Pipe 1-3/4 in. (44 mm) to 4 in. (102 mm) Outer Diameter	
Shipping Mode	UPS	Common Carrier or UPS (Must Specify "Unassembled" for UPS)

VERTICAL PATTERN ☐ **PD10188**



VERTICAL PATTERN ☐ **PD10189**



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Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Wideband 90° Sector Antennas

824-894 MHz

PD10197	**11.5 dBd Gain**	**AMPS**
PD10200	**14.5 dBd Gain**	**AMPS**

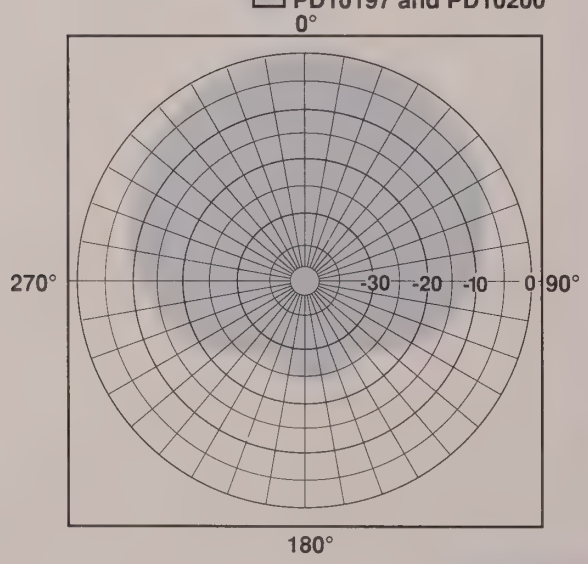
These panel antennas are especially designed for three sector AMPS cellular systems. Their wide bandwidth allows their use for transmit, receive and full duplex in both wireline and non-wireline applications. Their narrowed horizontal beam-widths make them ideal for mechanical downtilting to eliminate intracell overlap. Both feature a side-fed dipole design and low loss air dielectric strip line feed system. All aluminum components are irridited and stainless steel screws are double secured to eliminate non-linear joints. A high impact, low loss, UV stabilized radome protects radiating elements from hostile environments.

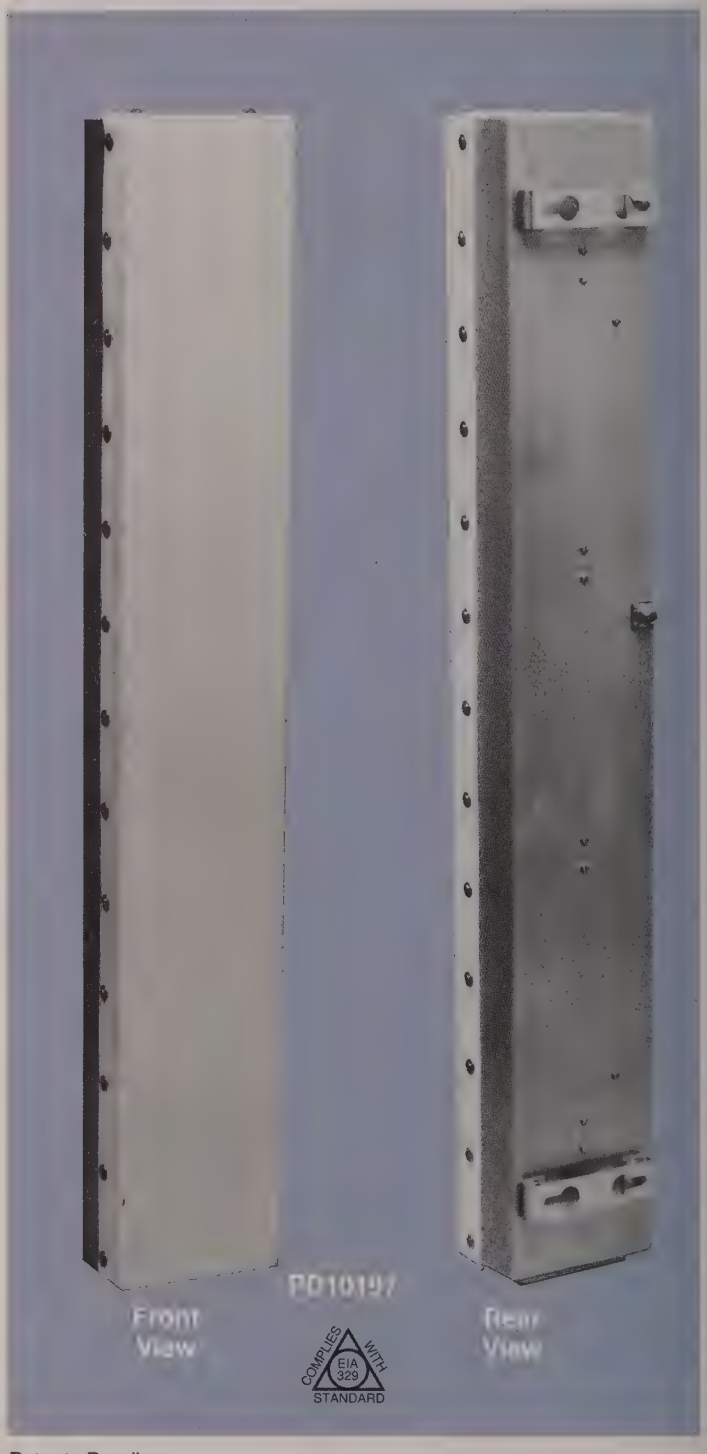
- **Slim profile** — Aesthetically pleasing, can be painted to blend with architecture.*
- **Weathertight radome** — Protects radiating elements, minimizes distortion due to ice build-up.
- **Irridited components** — Inhibits corrosion.

*Contact Sales Engineering for painting instructions.

HORIZONTAL PATTERN

PD10197 and PD10200





Patents Pending

CELWAVE RFS
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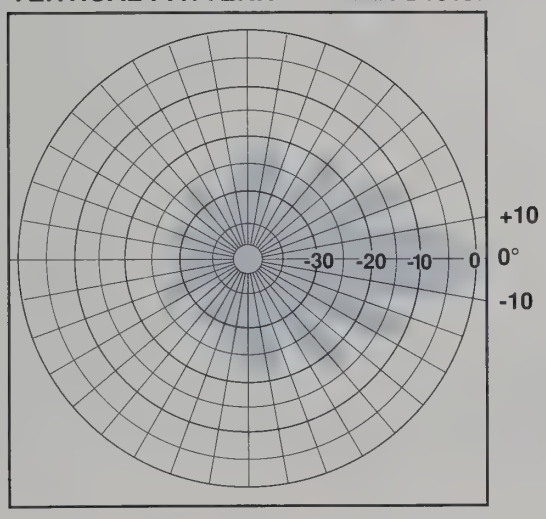
Wideband 90° Sector Antennas

ELECTRICAL SPECIFICATIONS	PD10197	PD10200
Frequency Range - MHz	824-894	824-894
Gain - dBd	11.5	14.5
Bandwidth - MHz for 1.5:1 VSWR	70	70
Horizontal Beamwidth 1/2 Power Points	90°	90°
Vertical Beamwidth 1/2 Power Points	14°	7°
Maximum Power Input - Watts	500	500
Front-to-Back Ratio - dBd	24	24
Lighting Protection	Direct Ground	Direct Ground
Termination - Direct	N-female	N-female

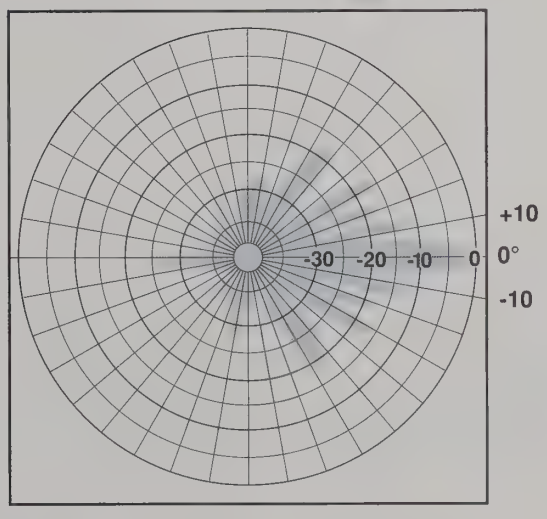
Note: All VSWR referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD10197	PD10200
Width - in. (mm)	7 (178)	7 (178)
Height - in. (mm)	46 (1168)	94 (2388)
Depth - in. (mm)	4.5 (114)	4.5 (114)
Weight - lbs. (kg)	10 (4.54)	21 (9.53)
Radiating Element Material	Irridited Aluminum Alloy	Irridited Aluminum Alloy
Radome Material	UV Stabilized High Impact ABS Plastic	UV Stabilized High Impact ABS Plastic
Reflector Material	5052-H32 Irridited Aluminum	5052-H32 Irridited Aluminum
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	2.24 (.208)	4.57 (.425)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)
Lateral Thrust at 100 mph - lbs. (kg)	89.6 (40.64)	182.8 (82.92)
Torsional Moment at 100 mph w/std. Mounting - ft./lbs (m/kg)	24 (3.32)	49 (6.78)
Mounting Hardware - Supplied	PD1253 Clamp Set Fits Support Pipe 1-3/4 in. (44 mm) to 4 in. (102 mm) Outer Diameter	
Shipping Mode	UPS	Common Carrier or UPS (Must Specify "Unassembled" for UPS)

VERTICAL PATTERN ☐ PD10197



VERTICAL PATTERN ☐ PD10200



CELWAVE RFS
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Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

60° Sector Antennas

806-960 MHz

PD10186	**7.0 dBd Gain**
PD10085	**10.0 dBd Gain**
PD10099	**13.0 dBd Gain**

Celwave's PD10186 (single), PD10085 (dual) and PD10099 (quad) antennas feature a high front to back ratio to ensure effective isolation from adjacent and co-channel interference in a cellular system. Their patterns are nearly impervious to tower changes.

Their enclosed design makes them less susceptible to damage from low amplitude and proximity lightning strikes. Their elements are almost completely shielded within the grounded reflector. A weather-resistant radome protects the antenna radiating element and feed point from icing, salt air, and acid rain.

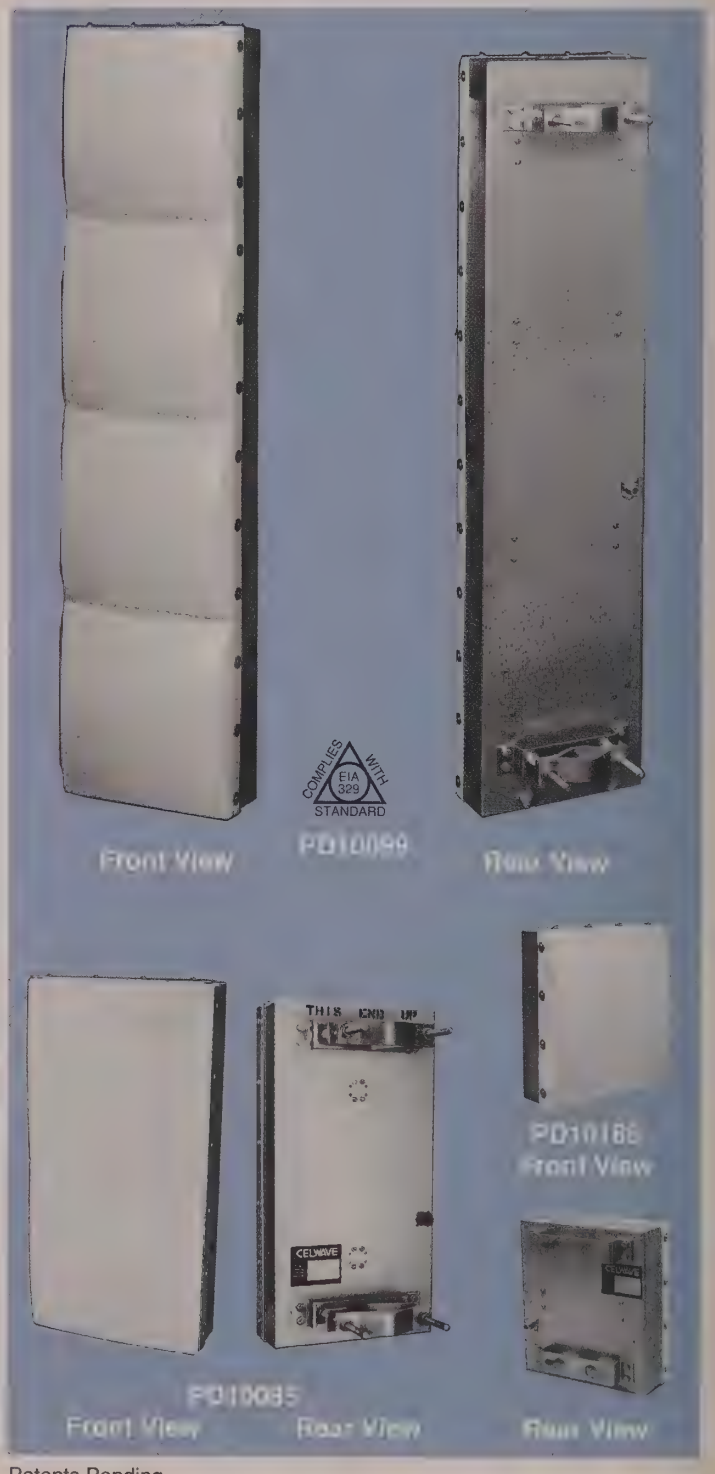
These panel antennas may be mounted back-to-back to provide dual system omni-coverage at the same tower elevation with only 30% more wind loading than one array. The PD10099 is a collinear array which provides high gain without compromising vertical beamwidth.

• **High front-to-back ratio**	Isolates from co-channel and adjacent sites.
• **Unobtrusive**	Blends in with architecture; can be painted to match surface.*
• **ABS Radome**	Protects radiating element and feed point from the environment.
• **Enclosed design**	Protects against low amplitude and proximity lightning strikes.

*Contact our Sales Engineering department for painting instructions.

Ordering Information

Item Number	Frequency Range - MHz
PD10099	806-960
PD10085	806-960
PD10186	806-960



Patents Pending

CELWAVE RFS
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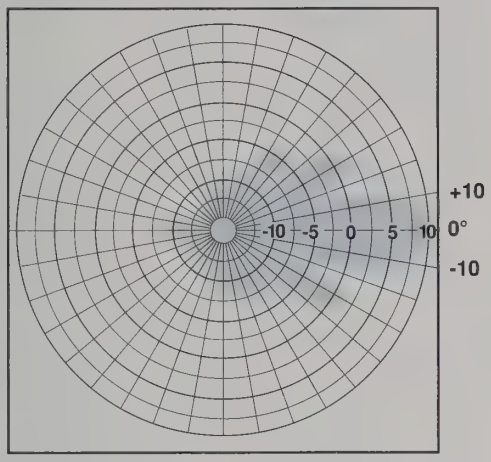
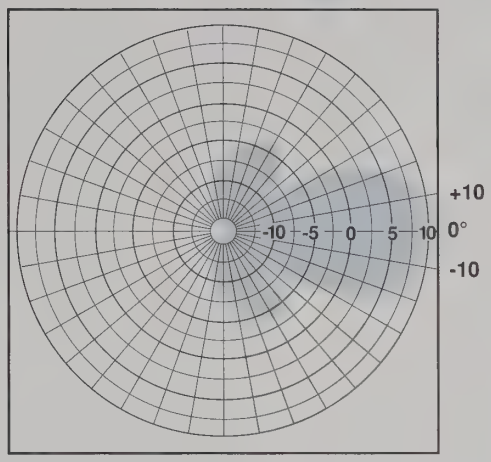
60° Sector Antennas

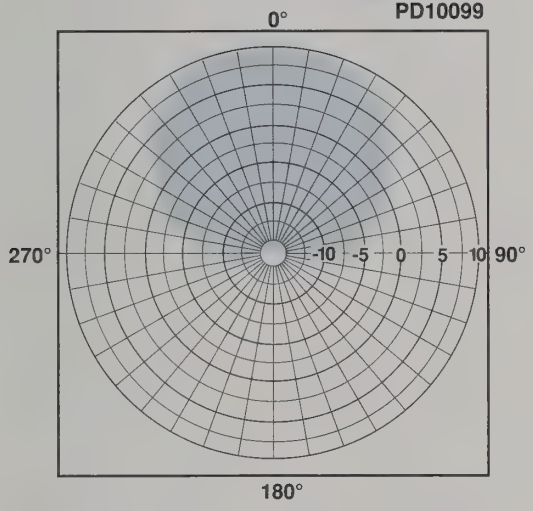
VERTICAL PATTERN ☐ PD10099



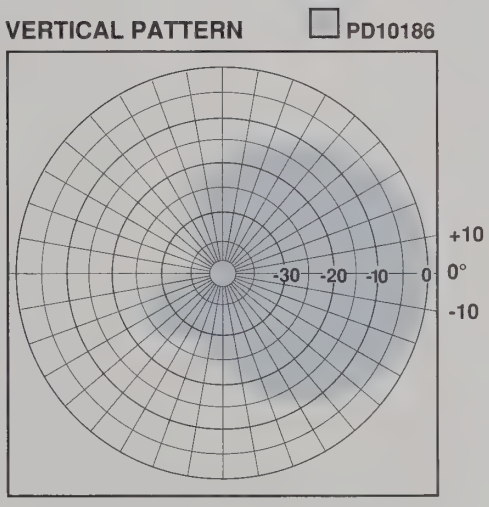
VERTICAL PATTERN ☐ PD10085

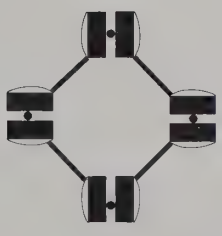


HORIZONTAL PATTERN ☐ PD10186 PD10085 PD10099

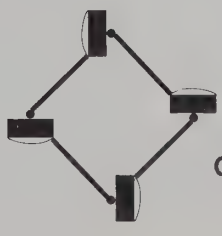


VERTICAL PATTERN ☐ PD10186





Dual System
(Back to Back)



Omnidirectional Array
(Top View)

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

60° Sector Antennas

ELECTRICAL SPECIFICATIONS	PD10186	PD10085	PD10099
Frequency Range - MHz	806-960	806-960	806-960
Gain - dBd	7.0	10.0	13.0
Bandwidth - MHz for 1.5:1 VSWR*	154	154	154
Horizontal Beamwidth 1/2 Power Points	62°	62°	62°
Vertical Beamwidth 1/2 Power Points	60°	35°	17°
Maximum Power Input - Watts	500	500	500
Front-to-Back Ratio - dBd	25 (30 Typical)	25 (30 Typical)	25 (30 Typical)
Lightning Protection	Direct Ground	Direct Ground	Direct Ground
Termination - Direct Fixed	N-female	N-female	N-female

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATION	PD10186	PD10085	PD10099
Width - in. (mm)	10-3/8 (264)	10-3/8 (264)	10-3/8 (264)
Height - in. (mm)	11-3/4 (298)	20 (508)	42 (1067)
Depth - in. (mm)	5 (127)	5 (127)	5 (127)
Weight - lbs. (kg)	7 (3.2)	10 (4.5)	23 (10.5)
Radiating Element Material	Aluminum Alloy (Irridited)		
Radome Material	Weather Resistant Plastic		
Reflector Material	5052-H32 Aluminum (Irridited)		
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	0.85 (0.08)	1.44 (.134)	3.02 (0.28)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	34 (15.4)	58 (26.2)	121 (54.8)
Torsional Moment @ 100 mph with Standard Mounting - ft./lbs. (m/kg)	6.8 (.94)	11.6 (1.6)	24.3 (3.4)
Mounting Hardware - Supplied	PD1253 Clamp Set Fits 1-3/4 in. (44 mm) to 4 in. (102 mm) Diameter Pipe		
Shipping Weight - lbs. (kg)	12 (5.4)	18 (8.2)	38 (17.3)
Shipping Volume - ft.³ (m³)	1 (.03)	2 (.06)	4 (.12)
Shipping Mode	UPS	UPS	UPS

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

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Omnidirectional Collinear Antennas

806-960 MHz

Super Stationmaster™ Series	
PD1108	**5.0 dBd Gain**
PD1109	**7.5 dBd Gain**
PD1109E	**7.5 dBd Gain**
PD10041 Heavy Duty	**7.5 dBd Gain**
PD10041E Heavy Duty	**7.5 dBd Gain**
PD1110	**9.0 dBd Gain**
PD10017	**10 dBd Gain**

These center-fed collinear antennas ensure consistent gain and impedance across the operating frequency band, and are specifically designed to meet various omnidirectional requirements for mobile radio services in the 806-960 MHz bands. Copper alloy radiating elements are encased in a weatherproof fiberglass low loss housing and permanently attached to a 6061-T6 aluminum support pipe.

The PD10041 antenna is a rugged version of the PD1109 having a wind velocity rating of 125 mph (200 km/hr). A pressurization option (PD1252) is available for PD1108, PD1109, PD1109E, PD1110, PD10041, PD10041E and PD10017 facilitating pressurization to 12 PSIG. *The above antennas may be mounted inverted. Specify option PD1254. The series is also available with high wind version radomes (200 mph rated wind velocity).*

Various reflector assemblies are shown on pages 97 and 98. Contact our Customer Service Department for specific pattern requirements.

- **Fiberglass construction** — Protects radiating elements in hostile environments.
- **Copper radiating elements** — Minimizes possible generation of intermod products.
- **Center-fed design** — Eliminates beamtilt across the band.

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Omnidirectional Collinear Antennas

Ordering Information

Item Number	High Wind Version	Frequency Range - MHz
PD1108-1		806-866
PD1108-2		825-890
PD1108-3		900-960
PD1108-4		820-880
PD1108-5		835-895
PD1109-1		806-866
PD1109E		824-894
PD1109-5		860-920
PD1109-6		895-960
PD10041-1		806-866
PD10041E		824-894
PD10041-3		860-920
PD10041-4		900-960
PD1110-1		800-836
PD1110-2	PD1110HW-2	820-855
PD1110-3	PD1110HW-3	845.5-880.5
PD1110-4		865-900
PD1110-5	PD1110HW-5	925-960
PD1110-6	PD1110HW-6	806-841
PD1110-7		831-866
PD1110-8		862-898
PD1110-9	PD1110HW-9	900-935
PD1110-10		885-920
PD10017-1		800-836
PD10017-2	PD10017HW-2	820-855
PD10017-3	PD10017HW-3	845.5-880.5
PD10017-4		865-900
PD10017-5	PD10017HW-5	862-898
PD10017-6	PD10017HW-6	925-960
PD10017-7	PD10017HW-7	806-841
PD10017-8		900-935
PD10017-9		831-866

ELECTRICAL SPECIFICATIONS	PD1108	PD1109	PD1109E
Frequency Range - MHz	806-960	806-960	824-894
Gain - dBd	5	7.5	7.5
Bandwidth - MHz for 1.5:1 VSWR	60	60	70
Vertical Beamwidth 1/2 Power Points	12°	8°	8°
Maximum Power Input - Watts	500	500	500
Lightning Protection	Direct Ground	Direct Ground	Direct Ground
Termination - Direct	N-female	N-female	N-female
Flexible Extension Supplied - in. (mm)	18 (457) RG393/U with N-male connectors		

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD1108	PD1109	PD1109E
Overall Length - ft. (m)	8.27 (2.52)	10.42 (3.18)	10.42 (3.18)
Element Housing Length - ft. (m)	6.10 (1.86)	8.25 (2.52)	8.25 (2.52)
Support Pipe Diameter - in. (mm)	2-3/4 (70)	2-3/4 (70)	2-3/4 (70)
Support Pipe Length - in. (mm)	24 (610)	24 (610)	24 (610)
Weight - lbs. (kg)	10 (4.5)	17 (7.71)	17 (7.71)
Radiating Element Material	Copper	Copper	Copper
Element Housing Material	Fiberglass	Fiberglass	Fiberglass
Support Pipe Material	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Wind Loading Area Flat Plate Equivalent - ft.² (m^2)	0.85 (.079)	1.28 (0.119)	1.28 (0.119)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	34 (15.5)	51 (23.2)	51 (23.2)
Bending Moment @ 100 mph 1 in. (25.4 mm) Below Top of Support Pipe - ft./lbs. (m/kg)	68 (9.4)	180 (24.9)	180 (24.9)
Mounting Hardware - Supplied	PD46 Clamp Set	PD46 Clamp Set	PD46 Clamp Set
Mounting Hardware - Optional	PD241 Wall Mount, PD246 Pole Mount, PD10024 Side Mount (Short), PD10028 Side Mount (Long)		
Shipping Weight - lbs. (kg)	29 (13.2)	35 (15.9)	35 (15.9)
Shipping Volume - ft.³ (m^3)	1.4 (.04)	2.43 (.068)	2.43 (.068)
Shipping Mode	Common Carrier	Common Carrier	Common Carrier

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Omnidirectional Collinear Antennas

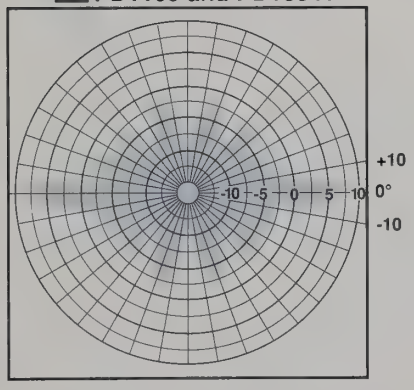
ELECTRICAL SPECIFICATIONS	PD10041	PD10041E	PD1110	PD10017
Frequency Range - MHz	806-960	824-894	806-960	800-960
Gain - dBd	7.5	7.5	9.0	10.0
Bandwidth - MHz for 1.5:1 VSWR	60	70	35	35
Vertical Beamwidth 1/2 Power Points	8°	8°	6°	5.5°
Maximum Power Input - Watts	500	500	500	500
Lightning Protection	Direct Ground	Direct Ground	Direct Ground	Direct Ground
Termination - Direct	N-female	N-female	N-female	N-female
Flexible Extension Supplied - in. (mm)	18 (457) RG393/U with N-male connectors			

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD10041	PD10041E	PD1110	PD10017
Overall Length - ft. (m)	10.42 (3.18)	10.42 (3.18)	13.17 (4.02)	15.17 (4.63)
Element Housing Length - ft. (m)	8.25 (2.52)	8.25 (2.52)	11 (3.35)	13 (3.96)
Support Pipe Diameter - in. (mm)	2-3/4 (70)	2-3/4 (70)	2-3/4 (70)	2-3/4 (70)
Support Pipe Length - in. (mm)	24 (610)	24 (610)	24 (610)	24 (610)
Weight - lbs. (kg)	19 (8.62)	19 (8.62)	20 (9.07)	25 (11.3)
Radiating Element Material	Copper	Copper	Copper	Copper
Element Housing Material	Fiberglass	Fiberglass	Fiberglass	Fiberglass
Support Pipe Material	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum	6061-T6 Aluminum
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	1.33 (.124)	1.33 (.124)	1.70 (.158)	2.00 (.186)
Rated Wind Velocity - mph (km/hr)	125 (201)	125 (201)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	53.2 (24.1)	53.2 (24.1)	68 (30.9)	80 (36.4)
Bending Moment @ 100 mph 1 in. (25.4 mm) Below Top of Support Pipe - ft./lbs. (m/kg)	190 (26.3)	190 (26.3)	340 (47.1)	480 (66.5)
Mounting Hardware - Supplied	PD46 Clamp Set	PD46 Clamp Set	PD46 Clamp Set	PD46 Clamp Set
Mounting Hardware - Optional	PD241 Wall Mount, PD246 Pole Mount, PD10024 Side Mount (Short), PD10028 Side Mount (Long)			
Shipping Weight - lbs. (kg)	36 (16.3)	36 (16.3)	37 (16.8)	46 (20.9)
Shipping Volume - ft.³ (m³)	2.43 (.068)	2.43 (.068)	2.74 (.077)	2.97 (.084)
Shipping Mode	Common Carrier	Common Carrier	Common Carrier	Common Carrier

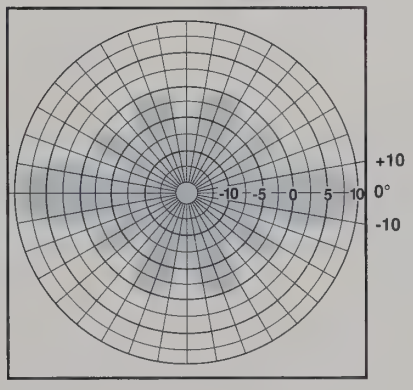
VERTICAL PATTERN

☐ PD1109E and PD10041E
☐ PD1109 and PD10041



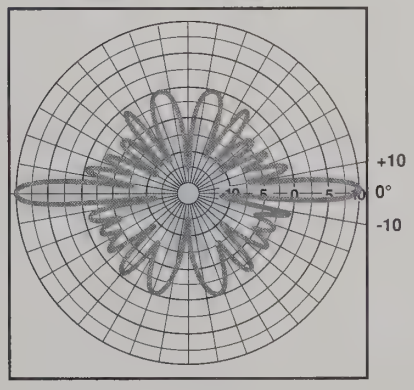
VERTICAL PATTERN

☐ PD1108



VERTICAL PATTERN

☐ PD1110 ■ PD10017



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800 MHz Reflector Antennas

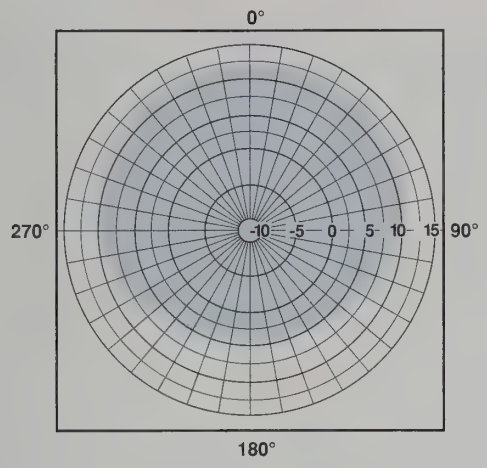
824-894 MHz

Listed below are the current 800 MHz antennas which utilize single or dual rod reflectors spaced either half-wavelength or quarter-wavelength behind the antenna. This configuration produces an offset type pattern. *Antennas may be invert mounted — request PD1254 invert mount option.*

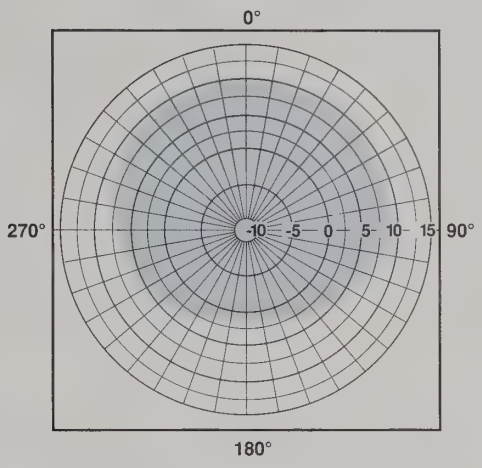
ORDERING NO.	DESCRIPTION	REFLECTOR	BANDWIDTH
10162-1A	PD1110-2	λ/4 Single	824-846.5
10162-1B	PD1110-2	λ/4 Single	835-849
10162-2A	PD1110-8	λ/4 Single	869-891.5
10162-2B	PD1110-8	λ/4 Single	880-894
10163-1A	PD1110-2	λ/2 Single	824-846.5
10163-1B	PD1110-2	λ/2 Single	835-849
10163-2A	PD1110-8	λ/2 Single	869-891.5
10163-2B	PD1110-8	λ/2 Single	880-894
10164-1A	PD10017-2	λ/4 Single	824-846.5
10164-1B	PD10017-2	λ/4 Single	835-849
10164-2A	PD10017-5	λ/4 Single	869-891.5
10164-2B	PD10017-5	λ/4 Single	880-894
10165-1A	PD10017-2	λ/2 Single	824-846.5
10165-1B	PD10017-2	λ/2 Single	835-849
10165-2A	PD10017-5	λ/2 Single	824-846.5
10165-2B	PD10017-5	λ/2 Single	880-894
10166-1A	PD1109E	λ/4 Single	824-846.5
10166-1B	PD1109E	λ/4 Single	835-849
10166-2A	PD1109E	λ/4 Single	869-891.5
10166-2B	PD1109E	λ/4 Single	880-894
10168-1A	PD1110-2	λ/4 Dual	824-846.5
10168-1B	PD1110-2	λ/4 Dual	835-849
10168-2A	PD1110-8	λ/4 Dual	869-891.5
10168-2B	PD1110-8	λ/4 Dual	880-894
10170-1A	PD10017-2	λ/4 Dual	824-846.5
10170-1B	PD10017-2	λ/4 Dual	835-849
10170-2A	PD10017-5	λ/4 Dual	869-891.5
10170-2B	PD10017-5	λ/4 Dual	880-894
10172-1A	PD1109E	λ/4 Dual	824-846.5
10172-1B	PD1109E	λ/4 Dual	835-849
10172-2A	PD1109E	λ/4 Dual	869-891.5
10172-2B	PD1109E	λ/4 Dual	880-894

800 MHz Reflector Antennas

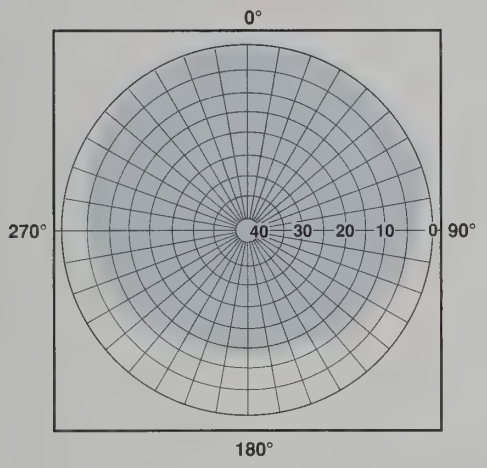
Horizontal pattern PD1110 with single reflector assembly.



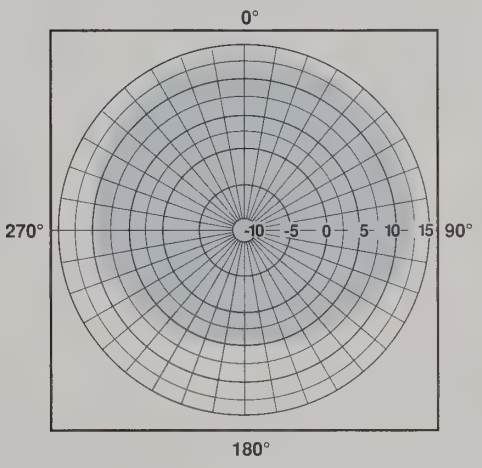
Horizontal pattern PD1109 with single reflector assembly.



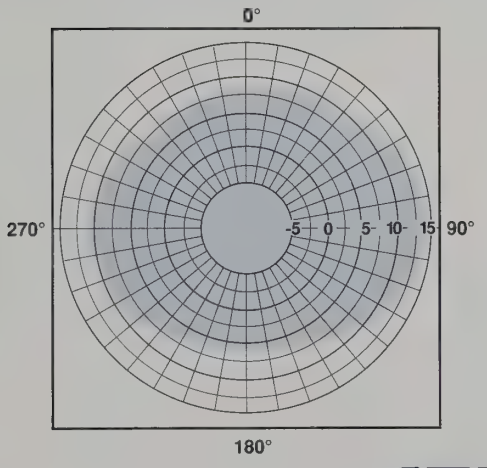
Horizontal pattern PD1110 with dual reflector assembly.



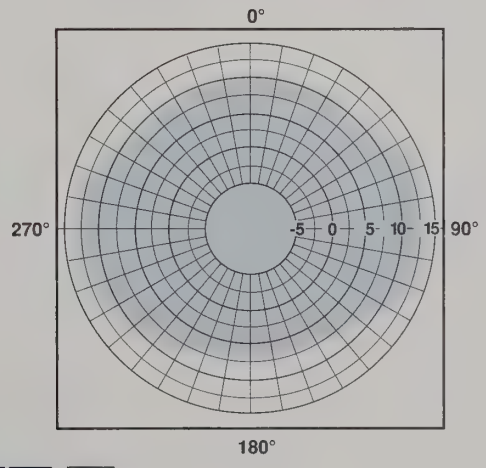
Horizontal pattern PD10017 with single reflector assembly.



Horizontal pattern PD1110 with single reflector assembly mounted λ/2 from 1/2" rod.



Horizontal pattern PD10017 with single reflector assembly mounted λ/2 from 1/2" rod.



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Fiberglass Collinear Antennas

928-932 MHz

PD10036*	**6 dBd Gain, Stationmaster™**
PD10037*	**9 dBd Gain, Stationmaster™**

*** Exact frequencies must be specified.**

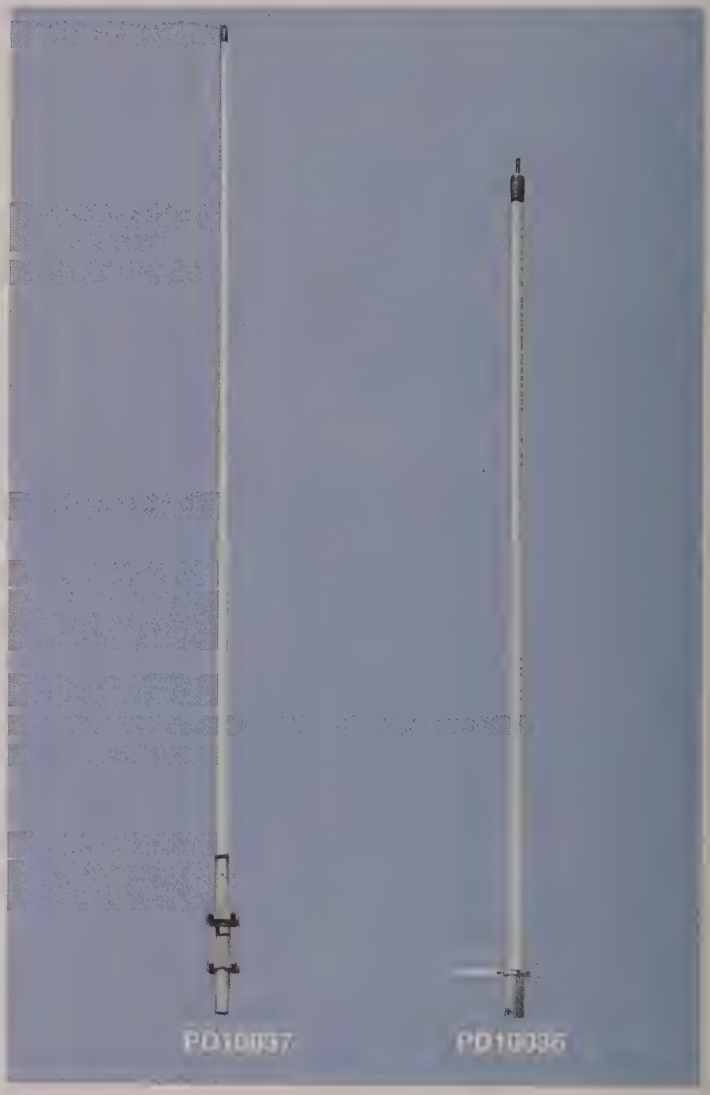
The Stationmaster series of land mobile radio communications base station antennas is internationally known. Each consists of a number of collinear radiating copper elements fed in phase and enclosed in a weatherproof fiberglass housing. Each is designed for maximum strength with minimum cross section. Stationmaster antennas will withstand winds of up to 100 miles per hour. Each is equipped with a special low loss insulated connector at the base of the support pipe. These strong, lightweight antennas are ideally suited for use in multiple antenna installations.

The PD10036 and PD10037 are specially designed to meet the needs of Paging Systems. The PD10036 provides medium gain and beamwidth while the PD10037 has high gain and narrow beamwidth.

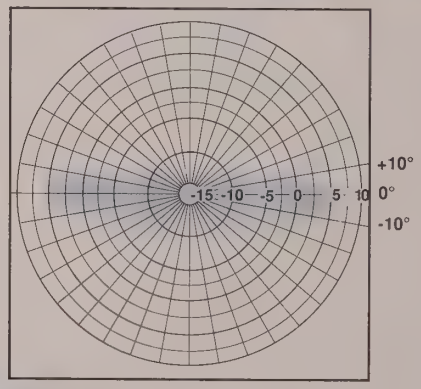
Vertical Beam Downtilt

The PD10036DT with 3° downtilt and the PD10037DT with 3° or 6° downtilt have radiation patterns to provide more directive area saturation where required. *Note: Operating gain and bandwidth are reduced with downtilt.* The PD10036DT has 5.5 dBd and 4 MHz bandwidth. The PD10037DT is reduced to 8.5 dBd gain and 3 MHz bandwidth. The power rating of both models is 500 Watts.

• **Small diameter fiberglass construction**	Lightweight and reduced wind loads.
• **Copper radiating elements**	Minimized possibility of intermod generation.
• **Withstands 100 mph wind forces**	Assures system reliability.



VERTICAL PATTERN ☐ PD10036



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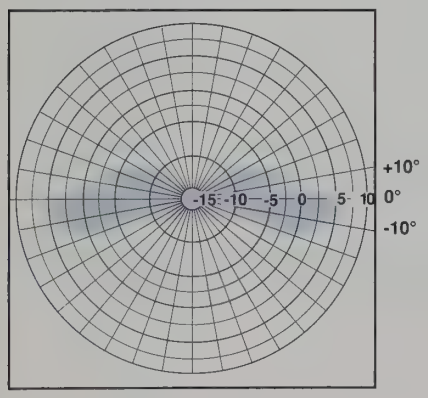
Fiberglass Collinear Antennas

ELECTRICAL SPECIFICATIONS	PD10036	PD10036DT	PD10037	PD10037DT
Downtilt	N/A	3°	N/A	3° or 6°
Gain - dBd	6	5.5	9	8.5
Bandwidth - MHz for 1.5:1 VSWR	7	4	5	3
Standard Bandwidths - MHz	928-932	928-932	928-932	928-932
Vertical Beamwidth 1/2 Power Points	16°	16°	6°	6°
Maximum Power Input - Watts	500	500	500	500
Lightning Protection	Direct Ground	Direct Ground	Direct Ground	Direct Ground
Termination - Direct Fixed	N-female	N-female	N-female	N-female
Flexible Extension - Supplied PD10036 and PD10037		18 in. (457mm) RG8A/U Flexible Cable w/N-male Connector Attached		

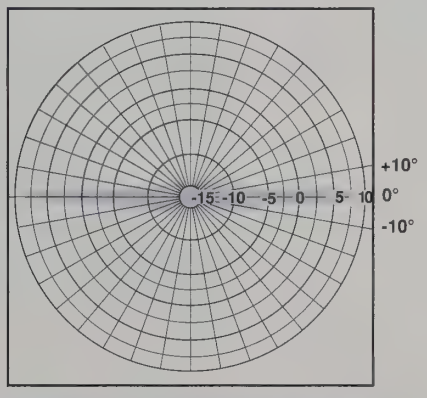
Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD10036 PD10036DT	PD10037 PD10037DT
Overall Length - in. (mm)	6 (1.83)	12.8 (3.90)
Element Housing Length - ft. (m)	5 (1.52)	11 (3.35)
Support Pipe Diameter - in. (mm)	1-15/16 (33.3)	1-15/16 (33.3)
Support Pipe Mounting Length - in. (mm)	12 (305)	22 (559)
Weight - lbs. (kg)	4 (1.81)	17 (7.71)
Radiating Element Material	Copper Alloy	Copper Alloy
Element Housing Material	Fiberglass	Fiberglass
Support Pipe Material	6061-T6 Aluminum	6061-T6 Aluminum
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	0.3 (.028)	1.375 (.128)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	12 (5.95)	55 (25)
Bending Moment 1 in. (25 mm) Below Ground Plane @ 100 mph - ft./lbs. (m/kg)	40 (5.5)	300 (41.6)
Mounting Hardware - Supplied	PD46 Clamp Set	PD46 Clamp Set
Mounting Hardware - Optional	PD241 Wall Mount PD246 Pole Mount PD402 Side Mount (Short) PD403 Side Mount (Long)	PD241 Wall Mount PD246 Pole Mount PD302 Side Mount (Short) PD303 Side Mount (Long)
Shipping Weight - lbs. (kg)	19 (8.62)	37 (16)
Shipping Volume - ft.³ (m³)	.71 (.02)	1.8 (.05)
Shipping Mode	UPS	Common Carrier

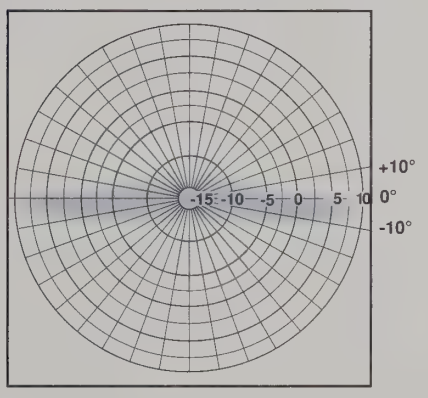
VERTICAL PATTERN ☐ PD10036DT



VERTICAL PATTERN ☐ PD10037



VERTICAL PATTERN ☐ PD10037DT



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Omnidirectional Collinear Antennas

806-960 MHz

PD10022 **Unity Gain**
PD1610 **3 dBd Gain**

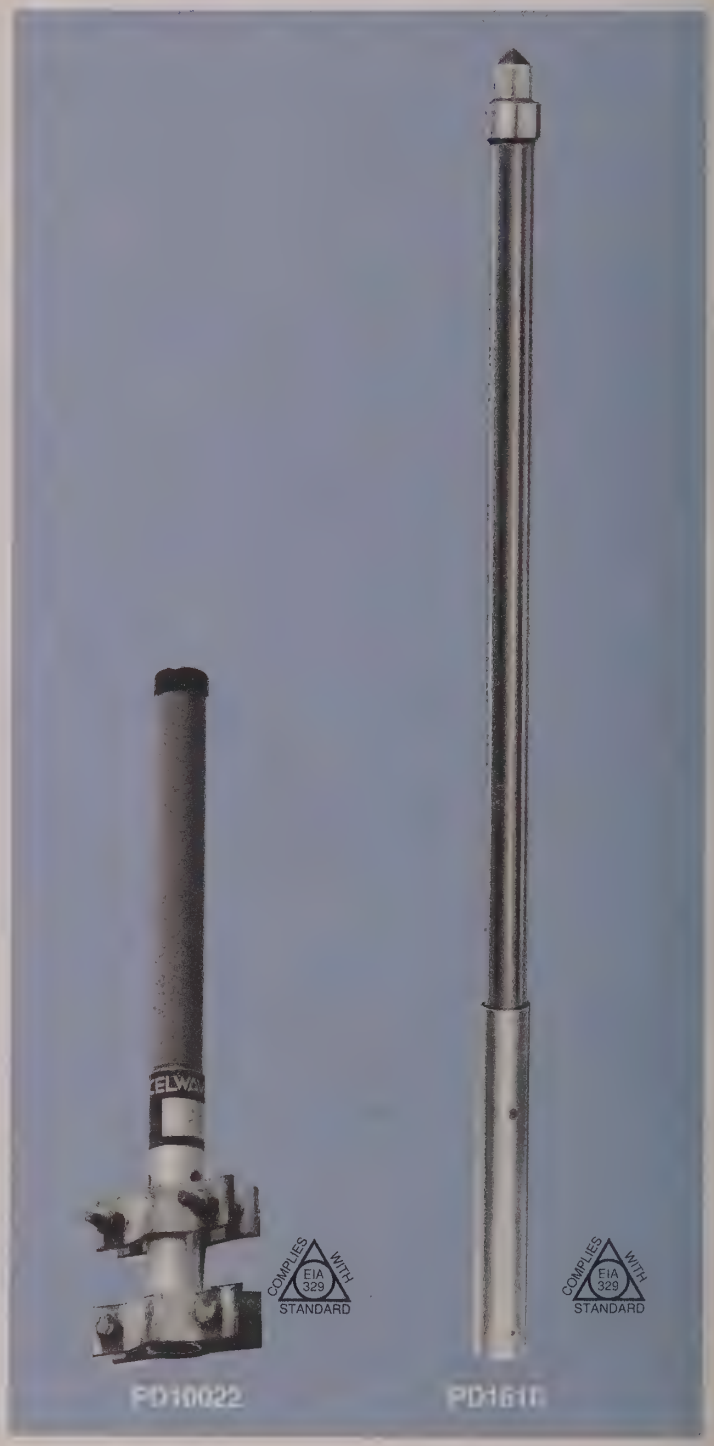
The PD10022 is ideal for conventional, trunking, cellular and paging applications that require a wide vertical beamwidth. The antenna is constructed of copper alloy radiating elements with a protective Fibercast™ housing and a support pipe of 6061-T6 Aluminum. The antenna's surface area creates minimal wind resistance to conserve tower loading capacity.

The PD1610 Collinear Antenna is specially designed to meet omnidirectional requirements for repeater control stations. This antenna is end-fed, utilizing copper alloy radiating elements encased in a weather-proof Fibercast™ support pipe. Minimal wind resistance conserves tower loading capacity.

- **Small diameter fiberglass construction** — Reduced wind loading.
- **Copper radiating elements** — Minimizes the possibility of intermod generation.
- **6061-T6 Aluminum support pipe** — Corrosion resistant for extended service.

Ordering Information

Item Number	Frequency Range - MHz
PD10022-1	806-880
PD10022-2	836-896
PD10022-3	880-960
PD1610-1	806-866
PD1610-2	820-880
PD1610-3	836-896
PD1610-4	896-960
PD1610-5	885-945



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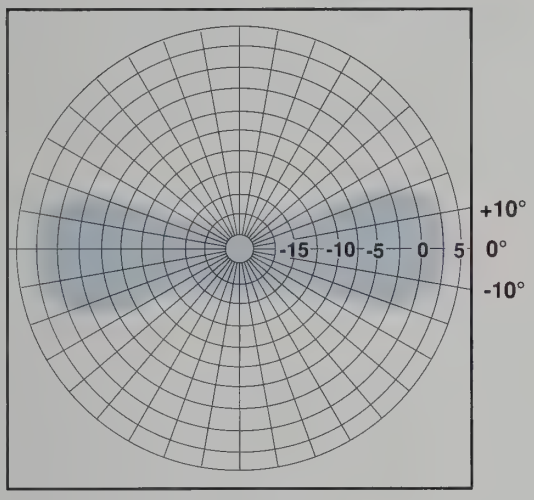
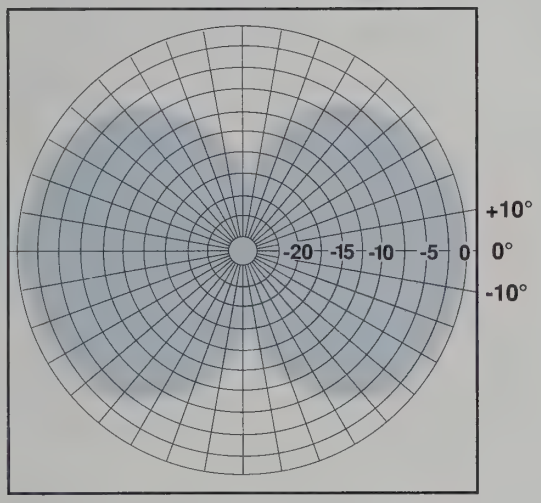
Omnidirectional Collinear Antennas

VERTICAL PATTERN ☐ PD1610



VERTICAL PATTERN ☐ PD10022



ELECTRICAL SPECIFICATIONS	PD10022	PD1610
Frequency Range - MHz	806-960	806-960
Gain - dBd	Unity	3
Bandwidth - MHz for 1.5:1 VSWR	70	70
Vertical Beamwidth 1/2 Power Points	80°	36°
Maximum Power Input - Watts	500	500
Lightning Protection	Direct Ground	Direct Ground
Termination - Direct Fixed	N-female	N-female
Flexible Extension - Supplied	18 in. (457 mm) RG393/U Flexible Cable with N-male Connector Attached	

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD10022	PD1610
Overall Length - in. (mm)	21 (533)	44 (1118)
Element Housing Length - in. (mm)	11 (279)	30 (762)
Support Pipe Diameter - in. (mm)	1.66 (42)	1.66 (42)
Support Pipe Mounting Length - in. (mm)	8 (203)	12 (305)
Weight - lbs. (kg)	1.6 (.7)	4 (1.81)
Radiating Element Material	Copper Alloy	Copper Alloy
Element Housing Material	1.5 in. (38 mm) Dia. Fibercast™ Radome	
Support Pipe Material	6061-T6 Aluminum	
Wind Loading Area Flat Plate Equivalent - ft.^{2} (m^2)	.13 (.012)	.36 (.028)
Rated Wind Velocity - mph (km/hr)	150 (240)	200 (320)
Lateral Thrust @ 100 mph - lbs. (kg)	11.3 (5.13)	48 (21.7)
Bending Moment 1 in. (25 mm) Below Top of Support Pipe @ 100 mph - ft./lbs. (m/kg)	5.5 (.75)	47 (6.5)
Mounting Hardware - Supplied	PD89 Clamp Set	PD46 Clamp Set
Mounting Hardware - Optional	PD241 Wall Mt., PD246 Pole Mt. PD10002 Side Mount (Short)	
Shipping Weight - lbs. (kg)	9 (4.08)	20 (9.07)
Shipping Volume - ft.^{3} (m^3)	.1 (.003)	.48 (.013)
Shipping Mode	UPS	UPS

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Cellular Marine Antennas

806-890 MHz

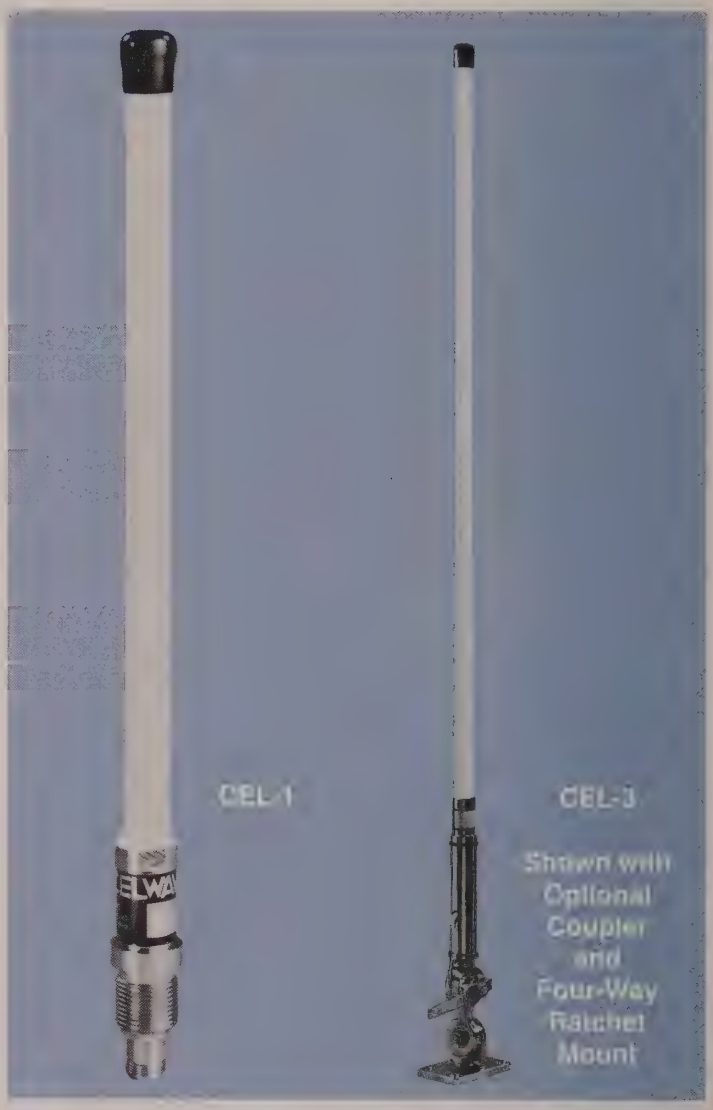
CEL-1/CEL-1A **3 dB Gain**
CEL-3/CEL-3A **6 dB Gain**

The CEL-1 and CEL-3 Series of marine antennas for 800 MHz mobile telephone service are ruggedly designed to perform in the most demanding environments. Both models feature copper and copper alloy internal construction, all stainless steel ferules, soft soldered electrical joints – encased in a heavy wall weather-resistant fiberglass radome. A white Polymer coating double seals the fiberglass and provides a smooth, glossy finish.

The CEL-1 and CEL-3 can be securely mounted almost any place. Choose from several types of mounting hardware – deck, wall, rail and sailboat mast or mast extension. If you wish to complement your VHF antenna, choose the 8 ft. CEL-3 for its VHF "look-alike" design. The CEL-1 is selected for its low profile at 20 inches.

The antennas are easily removed for storage without handling feed cable due to direct electrical termination at the base. Available in two frequency bands: 825-890 for Cellular Radio (CEL-1, CEL-3) and 806-866 for Trunking (CEL-1A, CEL-3A).

- **Low profile design** — CEL-1 only 20"; CEL-3 VHF look-alike.
- **Mounting flexibility** — Deck, wall, rail, sailboat mast or mast extension.
- **Direct electrical termination at base** — Antennas easily removed for storage.



ELECTRICAL SPECIFICATIONS	CEL-1	CEL-3
Frequency - MHz Cellular Trunking	825-890 806-866	
Gain - dB	3	6
Impedance - Ohms	50	
Polarization	Vertical	
Maximum Power Input - Watts	100	
Termination	Type-N female	

MECHANICAL SPECIFICATIONS	CEL-1	CEL-3
Antenna	Fiberglass Radome with White Polymer Coating	
Elements	Copper	
Base Fitting	Chrome Plated Brass; 1"-14 Threads male	
Number of Sections	1	
Overall Length - ft. (m)	1.6 (.5)	8 (2.4)
Mounting Type	Deck, Rail, Mast	
Weight - lbs. (kg)	.75 (.34)	2.75 (1.2)
Shipping Weight - lbs. (kg)	1.0 (.45)	5.0 (2.25)
Shipping Mode	UPS	UPS

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Cellular Marine Antennas

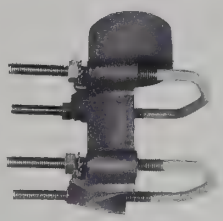
Mounting Applications

Power or sail...large or small craft, Celwave's unique antenna mounting hardware offers unlimited combinations for mounting your Celwave Marine Antenna.

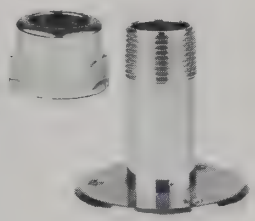
1"-14
Male Thread

Mounting Clamp
N230F

Sailboat Mast
Mount
N295F



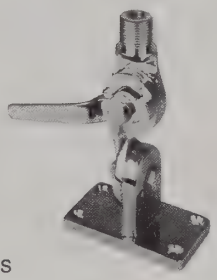
Universal Mount
N275F



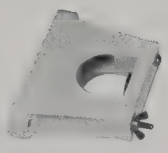
Deck Mount
PD54-5

Coupler
with Cable
N280F
N280N

Mast
Extensions
PD19-5
PD20-5



Four-Way
Ratchet
Mount
PD24-5



Upper Support
PD33-5

Deck/Cabin
Mount
PD16-5

Ordering Information

Item No.	Frequency Range	Description
CEL-1A	806-866	2', 3 dB Gain Cellular Antenna
CEL-3A	806-866	8', 6 dB Gain Cellular Antenna
CEL-1	825-890	2', 3 dB Gain Cellular Antenna
CEL-3	825-890	8', 6 dB Gain Cellular Antenna

Mounting & Accessories

Item No.	Description
PD16-5	Deck/Cabin Mount
PD24-5	4-Way Ratchet Mount
PD54-5	Deck Mount
N275F	Universal Mount
N295F	Sailboat Mast Mount
PD19-5	10' Extension Mast
PD20-5	5' Extension Mast
PD33-5	Upper Support
N230F	Mounting Clamp
N280F	Coupler w/18' White RG58A/U, 1 PD259 Connector Attached
N280N	Coupler w/ 18' White RG58A/U, 1 N-male Connector Attached

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Unidirectional Collinear Antenna

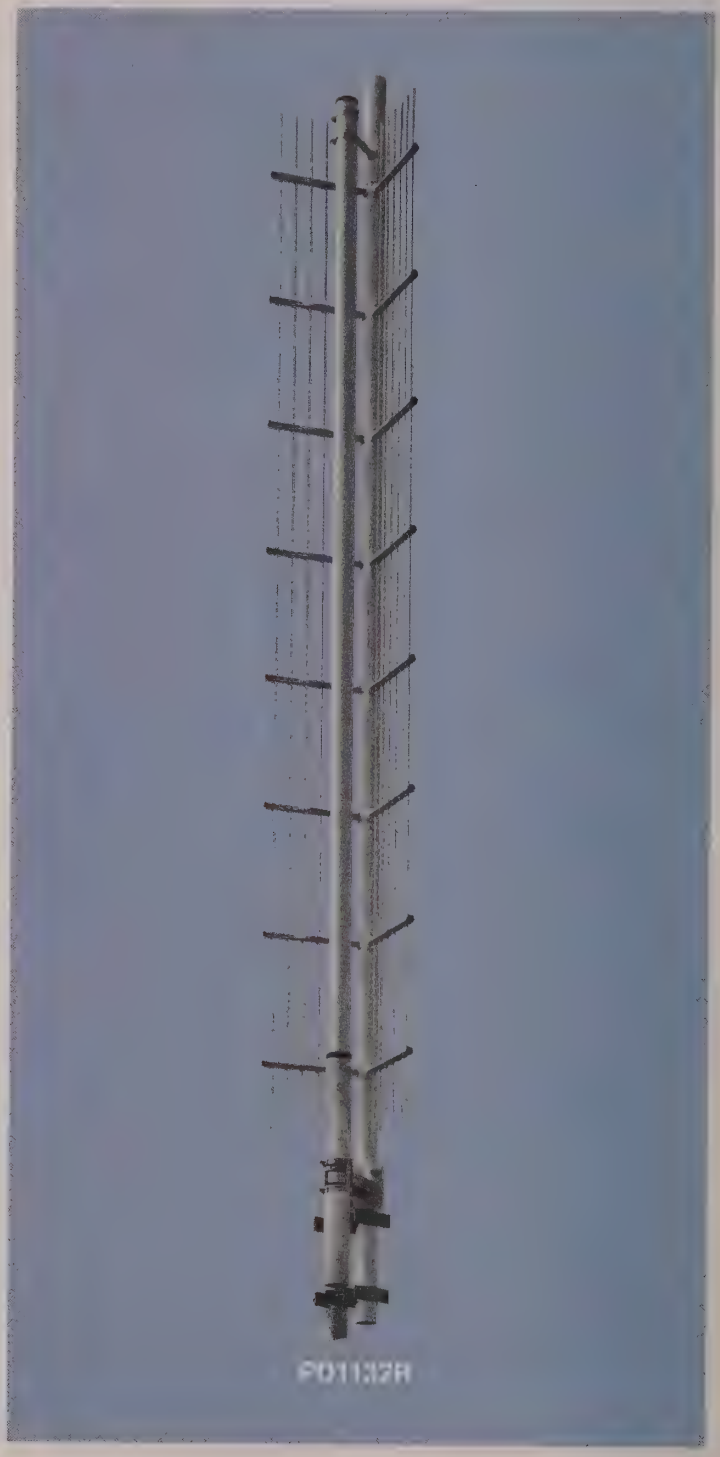
806-960 MHz

PD1132R 60° Sector Antenna

This antenna meets various sector coverage requirements for mobile radio services. It features durable copper alloy radiating elements encased in a weather-proof fiberglass housing which is joined to a sturdy reflector assembly of high strength aluminum. The PD1132R can be utilized for top or sidemounted applications. *For inverted mounting, specify option PD1254. A pressurization option PD1252 is available.*

The PD1132-RD was designed to provide dual independent directional coverage with space conservative mounting. Comprised of two separate directional antennas welded to a common support, the antenna features six standard frequency bands within its 806-960 MHz frequency range. The PD1132-RD is designed for side mounting. Three PD1132-RD antennas may be arranged combining six independent 60° horizontal beamwidths to yield 360° diversity coverage.

- **Fiberglass construction** — Protects radiating elements from corrosive environments.
- **Center-fed design** — Ensures consistent pattern across the band.
- **6061-T6 Aluminum reflectors** — Welded solid rods for maximum durability, high strength, low weight and corrosion resistance.
- **Copper radiating elements** — Minimizes possible generation of intermod products.



Ordering Information

Item Number	Frequency Range - MHz
PD1132R-1	806-866
PD1132R-2	820-880
PD1132R-3	824-891.5
PD1132R-4	835-895
PD1132R-5	860-920
PD1132R-6	900-960

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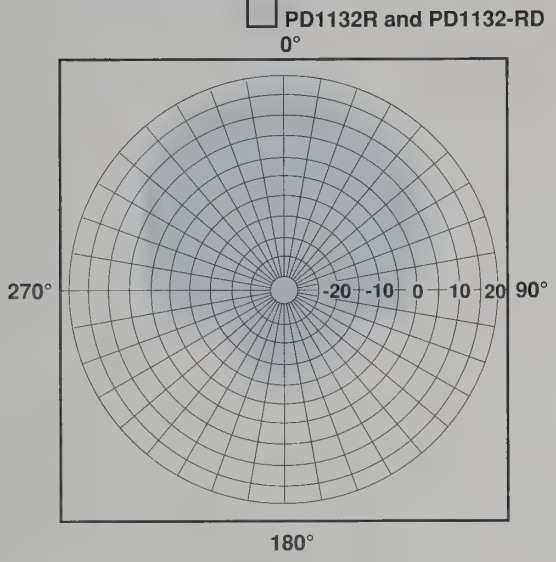
Unidirectional Collinear Antenna

HORIZONTAL PATTERN

☐ PD1132R and PD1132-RD



ELECTRICAL SPECIFICATIONS	PD1132R
Frequency Range - MHz	806-960
Gain - dBd	16±1
Bandwidth - MHz for 1.5:1 VSWR	60
Horizontal Beamwidth 1/2 Power Points	60°
Vertical Beamwidth 1/2 Power Points	8°
Maximum Power Input - Watts	500
Front-to-Back Ratio - dBd	25
Lightning Protection	Direct Ground
Termination - Direct Fixed	N-female
Flexible Extension - Supplied	18 in. (457 mm) RG393/U Flexible Cable with N-male Connectors Attached.

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD1132R
Overall Length - ft. (m)	11.5 (3.51)
Element Housing Length - ft. (m)	8.7 (2.67)
Support Pipe Diameter - in. (mm)	2-3/8 (60)
Reflector Size Width - in. (mm) Height - in. (mm)	 16 (406) 112 (2845)
Weight - lbs. (kg)	60 (27.3)
Radiating Element Material	Copper
Element Housing Material	Fiberglass
Reflector Material	6061-T6 Aluminum
Support Pipe Material	6061-T6 Aluminum
Wind Loading Area Flat Plate Equivalent - $ft.^2$ (m^2)	 5.50 (.511)
Rated Wind Velocity - mph (km/hr)	100 (161)
Lateral Thrust @ 100 mph - lbs. (kg)	220 (100)
Bending Moment 1 in. (25 mm) Below Top of Support Pipe @ 100 mph - ft./lbs. (m/kg)	N/A
Torsional Moment @ 100 mph with Standard Mounting - ft./lbs. (m/kg)	155 (21.5)
Mounting Hardware - Supplied	PD46 Clamp Set
Mounting Hardware - Optional	PD89 Top Support for Side Mounting PD10064 Wall Mounting Hardware (3 Required)
Shipping Weight - lbs. (kg)	95 (43.1)
Shipping Volume - $ft.^3$ (m^3)	17.1 (.49)
Shipping Mode	Common Carrier

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Expanded Spectrum AMPS Antenna

800-900 MHz

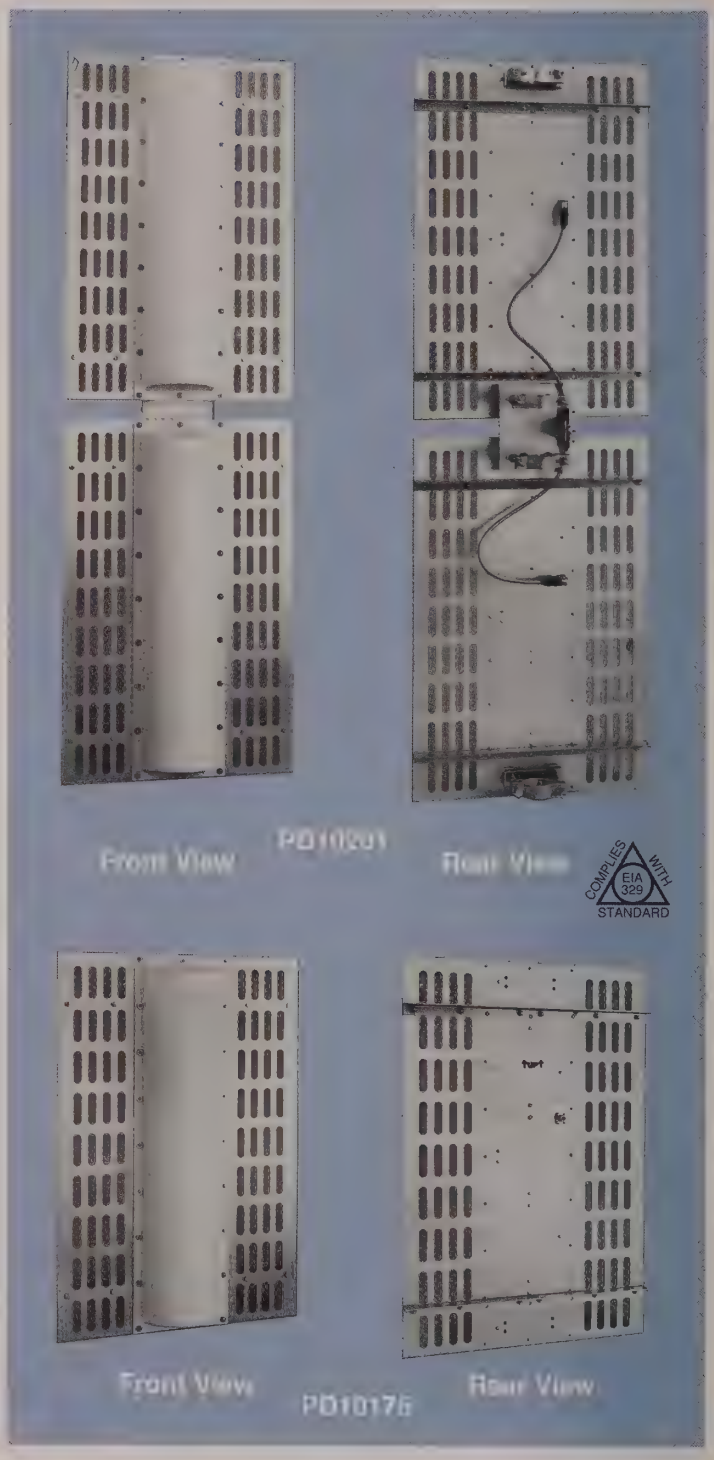
PD10176	**9.0 dBd Gain**
PD10201	**12.0 dBd Gain**

Celwave's PD10176 and PD10201 AMPS style, 105 degree sector antennas cover a 100 MHz bandwidth with 9 dBd and 12 dBd gain respectively. Their lightweight reflectors are slotted to reduce weight and wind load, and are constructed of irridited aluminum to inhibit corrosion. The design of both antennas includes a unique, side-fed dipole and strip line feed system for low loss and bandwidth. A high impact, ABS radome with weather tight, closed cell neoprene gasket protects radiating elements in all weather. The antennas do not require pressurization and are supplied with mounting bracket for AMPS monopole platform use. Tower leg mounting brackets, PD1253, are optional, as are 7/8 inch E.I.A. connectors.

• **100 MHz bandwidth**	Allows both Tx and/or Rx from same antenna Reduces inventory.
• **Air dielectric strip line feed**	Reduces loss and intermodulation susceptibility.
• **Slotted reflector**	Lightweight, easy to install, minimizes wind loading.
• **Weather tight radome and gasket**	High impact UV stabilized, low loss ABS. Protects elements and feed system in hostile environments.
• **Irridited aluminum**	Inhibits corrosion, reduces intermodulation susceptibility.

Ordering Information

Item Number	Description
PD10176-3	36" panel; No Hardware Supplied
PD10176-4	36" Panel; Hardware Supplied, PD1253 Clamp Set



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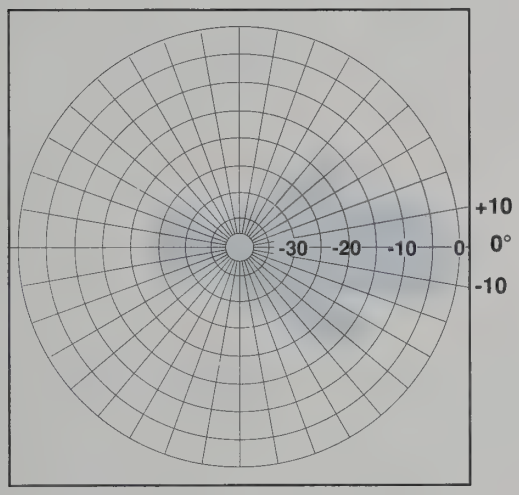
Expanded Spectrum AMPS Antenna

ELECTRICAL SPECIFICATIONS	PD10176	PD10201
Frequency Range - MHz	800-900	800-900
Gain - dBd	9	12
Bandwidth - MHz for 1.5:1 VSWR	100	100
Horizontal Beamwidth 1/2 Power Points	105°	105°
Vertical Beamwidth 1/2 Power Points	21°	10°
Maximum Power Input - Watts	500	500
Front-to-Back Ratio - dBd	25 min.	25
Lighting Protection	Direct Ground	Direct Ground
Termination - Direct	N-female	N-female

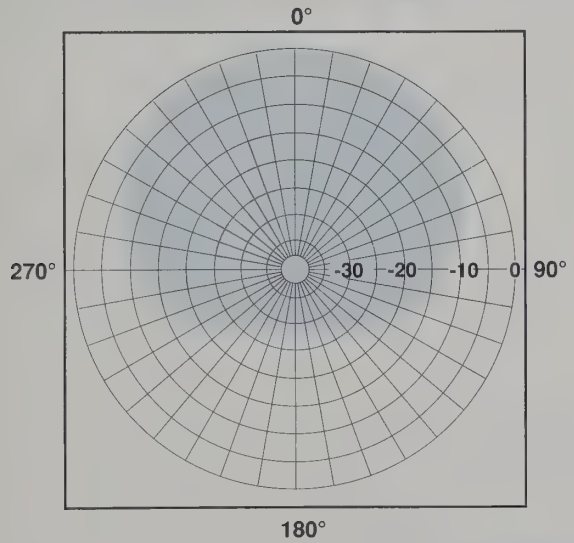
MECHANICAL SPECIFICATIONS	PD10176	PD10201
Height - in. (mm)	36 (914.4)	74 (1879.6)
Width - in. (mm)	24 (609.9)	24 (609.9)
Depth - in. (mm)	4 (101.6)	4 (101.6)
Weight - lbs. (kg)	13 (5.9)	28 (12.7)
Radiating Element Material	5052-H32 Aluminum Alloy	
Radome Material	Weather-Resistant Plastic	
Reflector Material	5052-H32 Irridited Aluminum	
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	4.94 (.46)	10 (.93)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)
Lateral Thrust at 100 mph - lbs. (kg)	198 (89.8)	400 (181)
Torsional Moment at 100 mph w/std. Mounting - ft./lbs. (kg/m)	14.6 (2.0)	29.2 (4.0)
Mounting Hardware - Supplied*	PD1253 Clamp Set, Fits Round Pipe, 1-3/4 in. (44 mm) to 4 in. (102 mm) outer diameter	

*Also available without clamps.

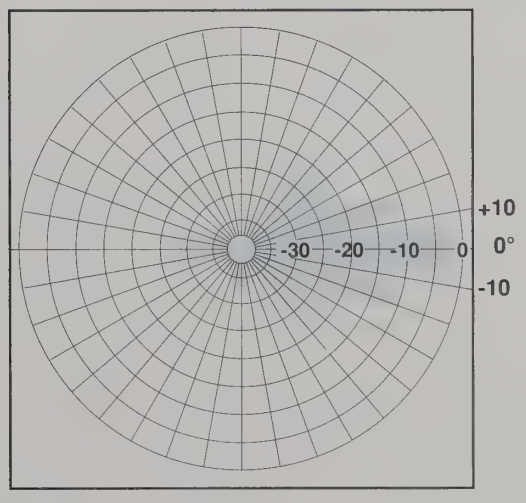
VERTICAL PATTERN ☐ PD10176



HORIZONTAL PATTERN ☐ PD10176



VERTICAL PATTERN ☐ PD10201



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Corner Reflector Antennas

806-960 MHz

PD10040	**8.0 dBd Gain**
PD1124	**9.0 dBd Gain**

These Corner Reflector Antennas were designed for use in the 806-960 MHz band. Both utilize a broadband radiating element capable of operating over an 80 MHz bandwidth with a maximum VSWR of 1.5:1. Standard available bandwidths are: 806-896 MHz and 880-960 MHz. A choice of horizontal beamwidths is offered: the PD10040 at 60° and the PD1124 at 46°.

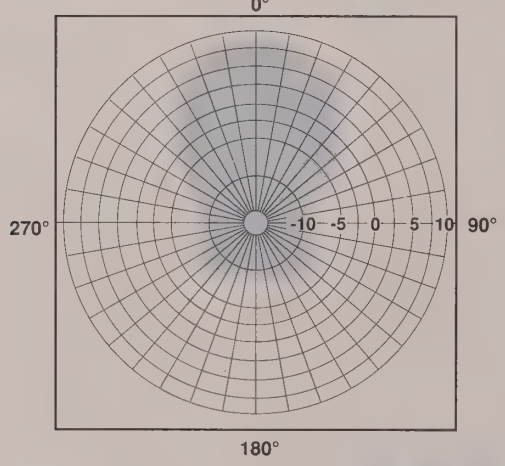
The radiating element and reflector are made of high strength aluminum alloy, irridited to minimize corrosion. The high gain and wide band characteristic of these antennas make them particularly suitable for use in control station-to-repeater link applications.

- **Broadband design** Allows duplex operation.
- **Irridited reflector and radiating element** Minimizes corrosion.
- **High front to back ratio** Provides isolation from adjacent systems.

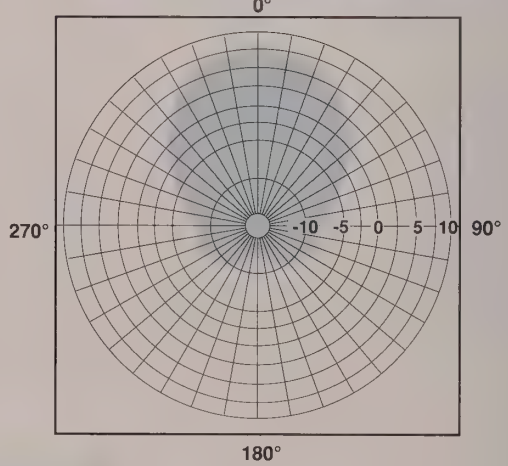
Ordering Information

Item Number	Frequency Range - MHz
PD10040-1	806-896
PD10040-2	880-960
PD1124-1	806-896
PD1124-2	880-960

HORIZONTAL PATTERN ☐ PD1124



HORIZONTAL PATTERN ☐ PD10040



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Corner Reflector Antennas

ELECTRICAL SPECIFICATIONS	PD1124	PD10040
Frequency Range - MHz	806-960	806-960
Gain - dBd	9.0	8.0
Bandwidth - MHz for 1.5:1 VSWR	80 or 90	80 or 90
Horizontal Beamwidth 1/2 Power Points	46°	60°
Vertical Beamwidth 1/2 Power Points	54°	54°
Maximum Power Input - Watts	100	100
Front-to-Back Ratio - dBd	25	20
Lightning Protection	Direct Ground	Direct Ground
Termination - Direct Fixed	N-female	N-female
Flexible Extension - Supplied	18 in. (457 mm) RG214/U Flexible Cable with N-male Connectors Attached	

Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD1124	PD10040
Reflector Size (Per Side) @ 850 MHz		
Width - in. (mm)	13 (330)	9.5 (241)
Height - in. (mm)	16 (406)	16 (406)
Weight - lbs. (kg)	11 (5.0)	10 (4.5)
Radiating Element Material	6061-T6 Aluminum Alloy	6061-T6 Aluminum Alloy
Reflector Material	5052-H32 Aluminum Alloy	5052-H32 Aluminum Alloy
Wind Loading Area @ 806 MHz		
Flat Plate Equivalent - $ft.^2$ (m^2)	2.63 (.244)	1.83 (.170)
Rated Wind Velocity - mph (km/hr)	100 (161)	100 (161)
Lateral Thrust @100 mph @ 806 MHz - lbs. (kg)	105 (47.7)	73 (33.2)
Torsional Moment @ 100 mph		
with Standard Mounting - ft./lbs. (m/kg)	29 (4.02)	14 (1.94)
Mounting Hardware - Supplied	PD1253 Clamp Set to fit 1-5/16 in. (33 mm) to 2-3/8 in. (60 mm) Diameter Pipe	
Shipping Weight - lbs. (kg)	17 (8)	16 (7.3)
Shipping Volume - $ft.^3$ (m^3)	1.4 (.04)	1.3 (.037)
Shipping Mode	UPS	UPS

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Yagi Antennas

806-960 MHz

PD10108 9 Element 10 dBd Yagi
PD10108D Dual Yagi 13 dBd

The PD10108 Broadband yagi is specifically designed for control station operation. This antenna is ruggedly constructed of 6061-T6 aluminum rod and pipe. Director and reflector elements are precision welded to their main boom, effectively eliminating misalignment problems during shipping, installation or service. Radiating elements are enclosed in a molded ABS radome to protect against severe environmental conditions and minimize pattern distortion due to ice buildup. The mounting hardware supplied facilitates mounting on either vertical of horizontal members. The small surface area of the PD10108 antenna minimizes wind resistance and conserves tower loading capacity.

The PD10108D consists of two PD10108 antennas stacked and fed in-phase through a matching transformer. Normal polarization is vertical, however, antennas may be horizontally polarized provided the connectors are in the same orientation.

- **6061-T6 Aluminum elements** — Welded solid rod for high strength, low weight and corrosion resistance.
- **Broadband** — Duplex operation for cellular and trunking applications.
- **Weatherproof radome** — Protects elements against severe weather conditions.

Ordering Information

Item Number		Frequency
Single	Dual	Range - MHz
PD10108-1	PD10108D-1	806-896
PD10108-2	PD10108D-2	880-960

*Normal polarization (of driven element) is vertical.

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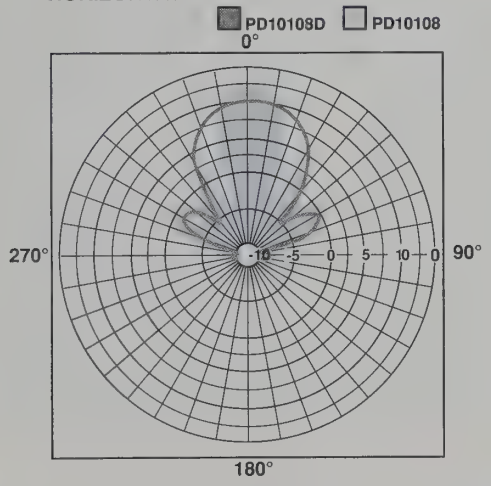
Yagi Antennas

ELECTRICAL SPECIFICATIONS	PD10108	PD10108D
Frequency Range - MHz	806-960	806-960
Gain - dBd	10	13
Bandwidth - MHz for 1.5:1 VSWR	80+	80+
Horizontal Beamwidth 1/2 Power Points	50°	22°
Vertical Beamwidth 1/2 Power Points	42°	42°
Maximum Power Input - Watts	150	150
Front-to-Back Ratio - dBd	20	20
Lightning Protection	Direct Ground	Direct Ground
Termination - Direct	N-female (Flexible Cable Option)	N-female (Flexible Cable Option)

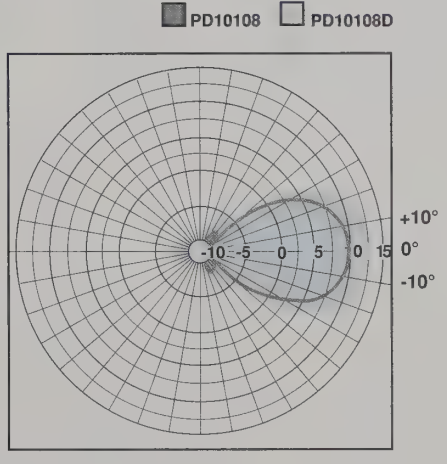
Note: All VSWR data referenced to 50 Ohms.

MECHANICAL SPECIFICATIONS	PD10108	PD10108D
Element Length @ 850 MHz - in. (mm)	7 (178)	7 (178)
Element Support Length @ 850 MHz - in. (mm)	31 (787)	31 (787)
Antenna Separation - in. (mm)	N/A	1-1/4λ
Weight - lbs. (kg) with Plate(s) with PD237 Clamp	5 (2.27) 8 (3.63)	13 (5.91) 19 (8.64)
Element Material	6061-T6 Aluminum	6061-T6 Aluminum
Element Support Material	3/4 in. (19.1) diameter 6061-T6 Aluminum Tube	3/4 in. (19.1) diameter 6061-T6 Aluminum Tube
Wind Loading Area Flat Plate Equivalent - ft.² (m²)	.18 (.017)	.38 (.035)
Rated Wind Velocity - mph (km/hr)	150 (242)	150 (242)
Lateral Thrust @ 100 mph - lbs. (kg)	7.2 (3.3)	15.2 (6.9)
Torsional Moment @ 100 mph with Standard Mounting - ft./lbs. (m/kg)	9.3 (1.3)	N/A
Mounting Hardware - Supplied	Either integral plate with U-bolts or PD237 Clamp	Either integral plate with U-bolts or PD237 Clamp
Shipping Weight - lbs. (kg) with Plate(s) with PD237 Clamp	7.3 (3.32) 10.3 (4.68)	15.3 (6.95) 21.3 (9.68)
Shipping Volume - ft.³ (m³)	2.0 (.06)	4.0 (.12)
Shipping Mode	UPS	UPS

HORIZONTAL PATTERN



VERTICAL PATTERN



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Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

THE PENETRATOR™ ANTENNAS

406 thru 960 MHz

These patented antennas provide higher gain, heavy null fill and beam tilt for blanket coverage and reduced interference from adjacent systems. They are available in omni or directional models providing up to 12 dBd and 16.3 dBd gain respectively over a bandwidth of 100 MHz. Beam tilt of 0.75° is standard. Custom beam tilts and field adjustable beam tilt can be provided as options. Special high power options of 1000 Watts and 3000 Watts input power available.

Adapted from TV/FM broadcasting, the design of the Penetrator series features an array of side fed dipoles with a multiple feed system to maximize both pattern and impedance.

• **High gain**	Maximizes ERP.
• **Heavy null fill**	Assures close-in system performance.
• **Customized beam tilt**	Minimizes interference to and from adjacent systems.
• **Built-in shape conformance**	Provides maximum pattern coverage.

See these pages for your specific applications:
UHF Wideband 114-119
Mobile, Cellular, Paging
Single Models 120-125
Dual Models 129-134
Multiple Service.....126-128

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Penetrator™ - For UHF Wideband Applications

406-420 MHz

AGR9*, AGR8*, AGR6*

*** Pattern desired (O, A, B) must be specified after model number.**
U.S. Patent 4,518,969

These units enable operators to cover the complete business band with a single antenna. They deliver 6, 8 or 9 dBd omnidirectional gain over a bandwidth up to 45 MHz. All feature constant beam tilt, directional horizontal pattern and have been VSWR tested.

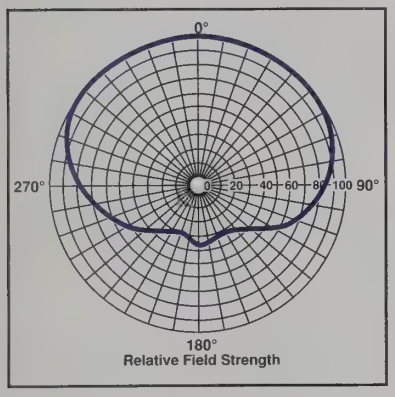
To Order, Specify:
1. Model - AGR
2. Gain - 6, 8 or 9 dB
3. Pattern - O, A, or B
4. Mounting Bracket - B1

Example: AGR9A-B1

PATTERN AND GAIN SPECIFICATIONS

Gain shown is the minimum value over the operating bandwidth.

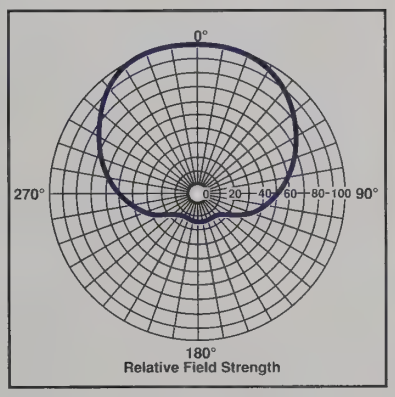
PATTERN A
220° COVERAGE



Peak Gain Values

Model	Gain (dBd)
AGR9A	11.3 dB
AGR8A	10.3 dB
AGR6A	8.3 dB

PATTERN B
140° COVERAGE



Peak Gain Values

Model	Gain (dBd)
AGR9B	13.0 dB
AGR8B	12.0 dB
AGR6B	10.0 dB

PATTERN O
360° COVERAGE
(Omnidirectional ± 1.5 dB Maximum)

Average Gain Values

Model	Gain (dBd)
AGR9	9.0 dB
AGR8	8.0 dB
AGR6	6.0 dB

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Penetrator™ - For UHF Wideband Applications

SPECIFICATIONS

All models are designed to meet or exceed EIA standard RS 329.

ELECTRICAL SPECIFICATIONS	AGR SERIES PENETRATOR
Design Frequency Band - MHz	406-420 (14 MHz Bandwidth)
Polarization	Vertical
Null Fill 9 dB, 8 dB	Uniform Signal Strength on Ground From Antenna Site to Horizon.
6 dB	None (standard)
Beam Tilt - 9 dB, 8 dB (Standard) 6 dB	-3/4° None
Input VSWR	1.5:1 Maximum
Input Connector	N-female 50 Ohms
Max. Input Power	500 Watts
Lightning Protection	Top Rod Grounded to Base Mount

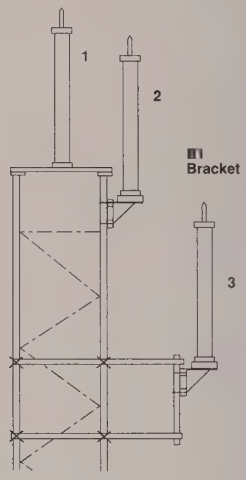
MECHANICAL SPECIFICATIONS	9 dB	8 dB	6 dB
Length - ft. (m)	20 (6.1)	14 (4.3)	10.7 (3.3)
Radome Diameter - in. (mm)	8-5/8 (218.9)	8-5/8 (218.9)	8-5/8 (218.9)
Weight - lbs. (kg)			
A and B Pattern	97 (44)	73 (33)	57 (26)
– With B1 Bracket	148 (67)	124 (56)	108 (49)
– With Add'l Mtg. Hardware	173 (78)	149 (67)	133 (60)
O Pattern	107 (48)	81 (36)	62 (28)
– With B1 Bracket	158 (71)	132 (59)	113 (51)
– With Add'l Mtg. Hardware	183 (82)	157 (71)	138 (62)
Survival Wind Force - psf (100 mph)			
A and B Pattern	50	50	50
O Pattern	50	50	50
Max. Wind Shear - lbs. (100 mph)			
A and B Pattern	480	337	257
O Pattern	503	357	270
Wind Loading Area - ft.² (m^2)			
A and B Pattern	14.4 (1.34)	10.1 (.94)	7.7 (.72)
O Pattern	15.1 (1.40)	10.7 (.99)	8.1 (.75)
Mounting	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount		
Materials	Aluminium and Fiberglass		

OPTIONS AVAILABLE

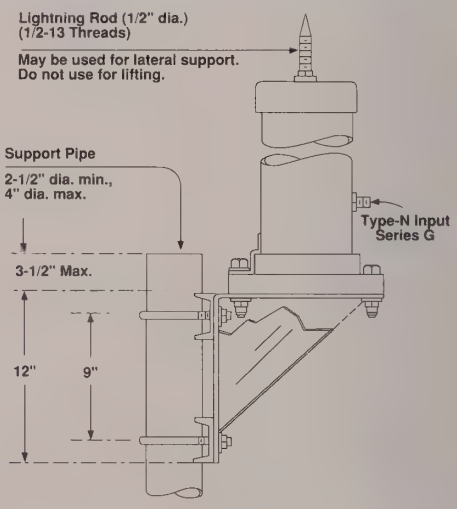
- Power handling to 3000 Watts.
- Other electrical beam tilt values.
- Beam tilt adjustable by user on tower.
- Higher wind survival.
- Multiple antennas in one radome.
- Other operating bands available.

TYPICAL MOUNTING CONFIGURATIONS

1. FLANGE TOP MOUNT
Mount directly to tower with eight 3/4" diameter bolts on a 11-3/4" bolt circle.
2. TOWER LEG TOP MOUNT
Mount directly to tower leg 2-1/2" to 4" in diameter with antenna above top of tower.
3. VERTICAL POLE SIDE MOUNT
Mount to 2-1/2" to 4"diameter pole.



B1 MOUNTING BRACKET


Lightning Rod (1/2" dia.) (1/2-13 Threads)
May be used for lateral support. Do not use for lifting.
Support Pipe
2-1/2" dia. min., 4" dia. max.
Type-N Input Series G
3-1/2" Max.
12"
9"

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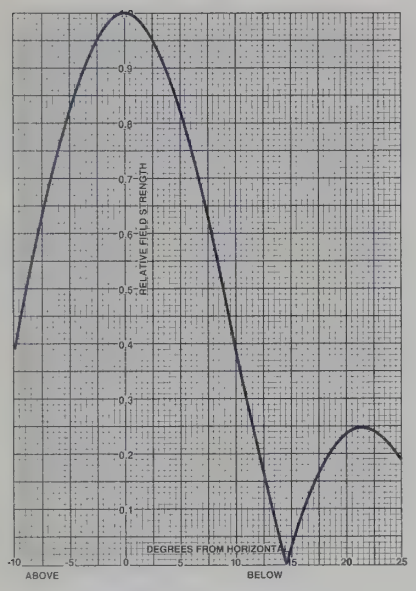
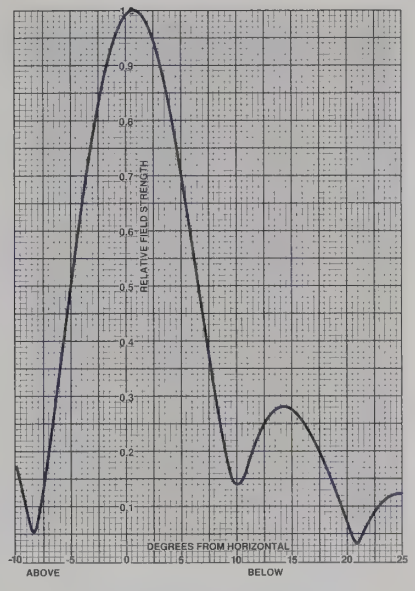
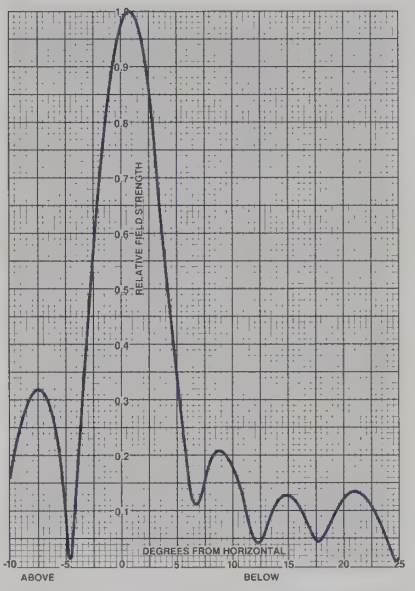
Penetrator™ - For UHF Wideband Applications



VERTICAL PATTERN
A( )R6
Beam Tilt - 0.0°
Gain (Main Lobe) - 6.0 dB

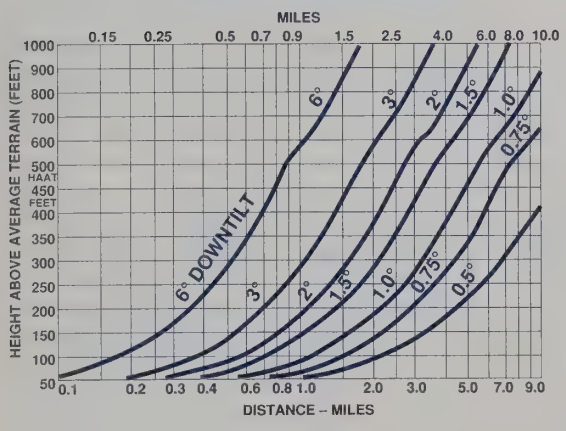


VERTICAL PATTERN
A( )R8
Beam Tilt - 0.75°
Gain (Main Lobe) - 8.0 dB



VERTICAL PATTERN
A( )R9
Beam Tilt - 0.75°
Gain (Main Lobe)- 9.0 dB

DOWNTILT vs. ANTENNA HEIGHT & DISTANCE



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Penetrator™ - For UHF Wideband Applications

450-512 MHz

ALR10*, ALR8*, ALR6* 450-482 MHz
AHR10*, AHR8*, AHR6* 470-512 MHz

*** Pattern desired (O, A, B, D) must be specified after model number.**
U.S. Patent 4,518,969

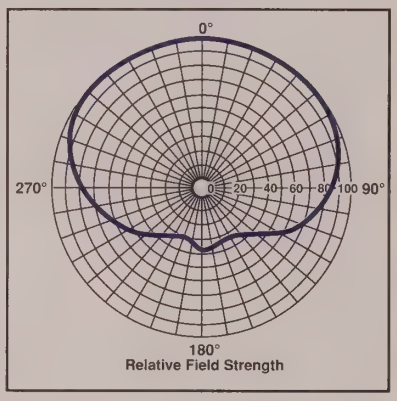
Enabling operators to cover the complete business band with one antenna, these units deliver 6, 8, or 10 dBd over a bandwidth up to 42 MHz. All feature constant beam tilt, heavy null fill, omnidirectional or directional horizontal pattern and have been VSWR tested.

PATTERN AND GAIN SPECIFICATIONS

Gain shown is the minimum value over the operating bandwidth.

To Order, Specify:
1. Model - ALR or AHR
2. Gain - 6, 8 or 10 dB
3. Pattern - O, A, B, or D
4. Mounting Bracket - B1 or B2
   (B2 not suitable for 10 dB models)
   Example: ALR10B-B1

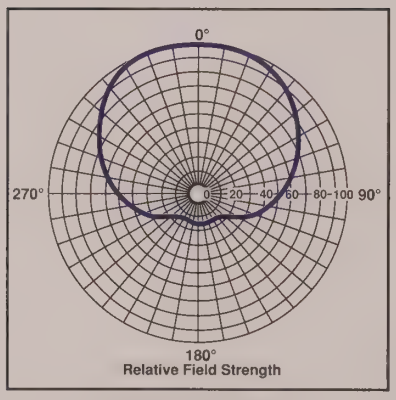
PATTERN A
220° COVERAGE



Peak Gain Values

Model	Gain (dBd)
ALR10A, AHR10A	12.3 dB
ALR8A, AHR8A	10.3 dB
ALR6A, AHR6A	8.3 dB

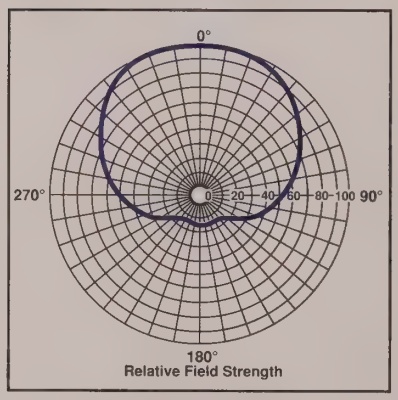
PATTERN B
140° COVERAGE



Peak Gain Values

Model	Gain (dBd)
ALR10B, AHR10B	14.0 dB
ALR8B, AHR8B	12.0 dB
ALR6B, AHR6B	10.0 dB

PATTERN D
120° COVERAGE



Peak Gain Values

Model	Gain (dBd)
ALR10D, AHR10D	14.3 dB
ALR8D, AHR8D	12.3 dB
ALR6D, AHR6D	10.3 dB

PATTERN O
360° COVERAGE

(Omnidirectional ± 1.5 dB Maximum)

Average Gain Values

Model	Gain (dBd)
ALR10, AHR10	10.0 dB
ALR8, AHR8	8.0 dB
ALR6, AHR6	6.0 dB

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Penetrator™ - For UHF Wideband Applications

SPECIFICATIONS

All models are designed to meet or exceed EIA standard RS 329.

ELECTRICAL SPECIFICATIONS

Design Frequency Band - MHz Model ALR	450-482 (32 MHz Bandwidth)
Model AHR	470-512 (42 MHz Bandwidth)
Polarization	Vertical
Null Fill 10 dB, 8 dB	Uniform Signal Strength on Ground From Antenna Site to Horizon.
6 dB	None (standard)
Beam Tilt - 10 dB, 8 dB (Standard) 6 dB	-3/4° None
Input VSWR	1.5:1 Maximum
Input Connector	N-female 50 Ohms
Max. Input Power	500 Watts
Lightning Protection	Top Rod Grounded to Base Mount

MECHANICAL SPECIFICATIONS

Length - ft. (m) – 10 dB	20 (6.1) Plus Lightning Rod
– 8 dB	12 (4.18) Plus Lightning Rod
– 6 dB	8 (2.44) Plus Lightning Rod
Diameter - in. (mm)	6-5/8 (168.3)
Weight - lbs. (kg)	
10 dB	92 (41.4) Flanged
– With B1 Bracket	124 (55.8)
– With B2 Bracket (100 mph)	108 (48.6)
8 dB	52 (23.4) Flanged
– With B1 Bracket	84 (37.8)
– With B2 Bracket	68 (30.6)
6 dB	36 (16.2) Flanged
– With B1 Bracket	68 (30.6)
– With B2 Bracket	52 (23.4)
Survival Wind Force - psf (100 mph)	50
Max. Wind Shear - lbs. (100 mph)	
– 10 dB	380
– 8 dB	224
– 6 dB	150
Wind Loading Area - ft.² (m²) Flat Plate Equivalent	
– Series 6	3.0 (.278)
– Series 8	4.5 (.418)
– Series 10	7.6 (.706)
Mounting	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount
Materials	Aluminium and Fiberglass (Blue Standard)

OPTIONS AVAILABLE

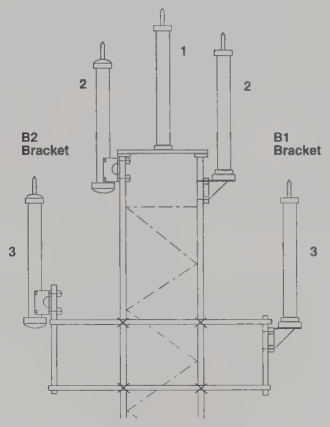
- Power handling to 3000 Watts.
- Other electrical beam tilt values.
- Beam tilt adjustable by user on tower.
- Higher wind survival.
- Multiple antennas in one radome.
- Other operating bands available.

TYPICAL MOUNTING CONFIGURATIONS

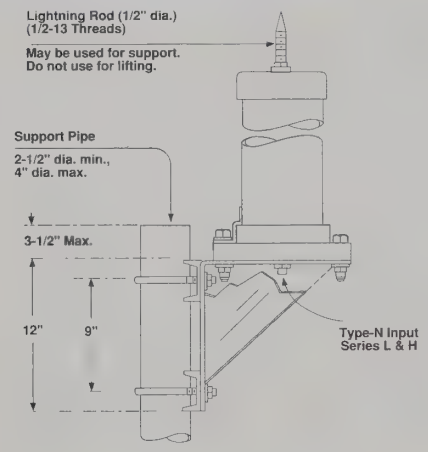
1. FLANGE TOP MOUNT
Mount directly to tower top with eight 3/4" diameter bolts on a 9-1/2" bolt circle. (Flanged units only).

2. TOWER LEG TOP MOUNT
Mount directly to tower leg 2-1/2" to 4" in diameter with antenna above top of tower.

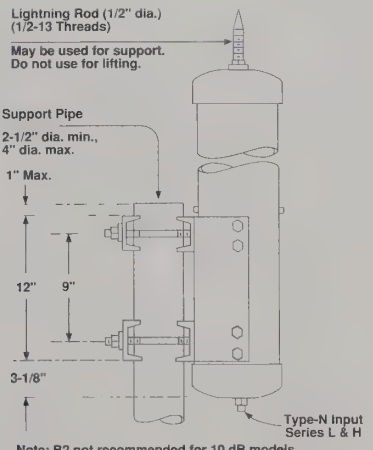
3. VERTICAL POLE SIDE MOUNT
Mount to 2-1/2" to 4"diameter pole.



B1 MOUNTING BRACKET



B2 MOUNTING BRACKET



Note: B2 not recommended for 10 dB models.

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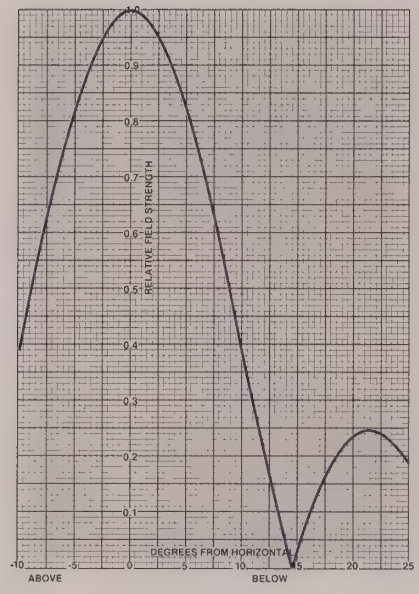
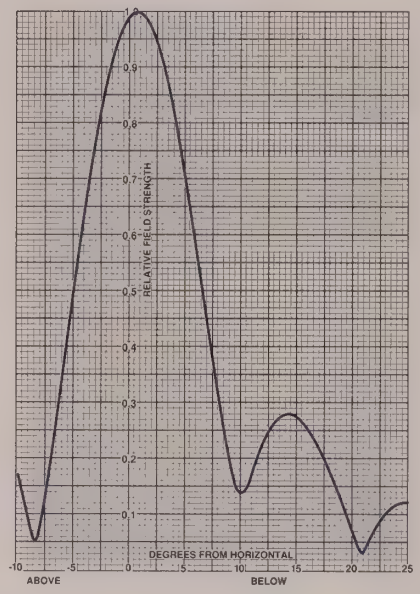
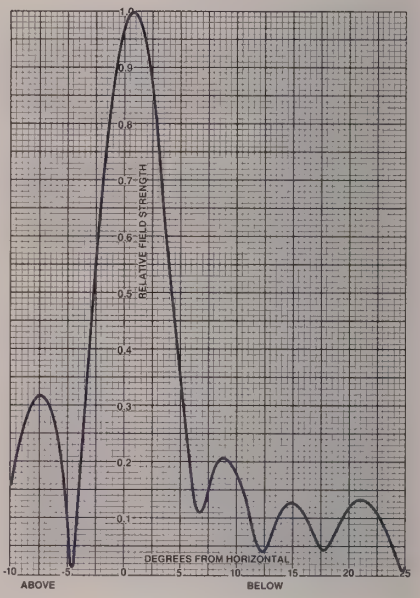
Penetrator™ - For UHF Wideband Applications



VERTICAL PATTERN
A( )R6
Beam Tilt - 0.0°
Gain (Main Lobe) - 6.0 dB

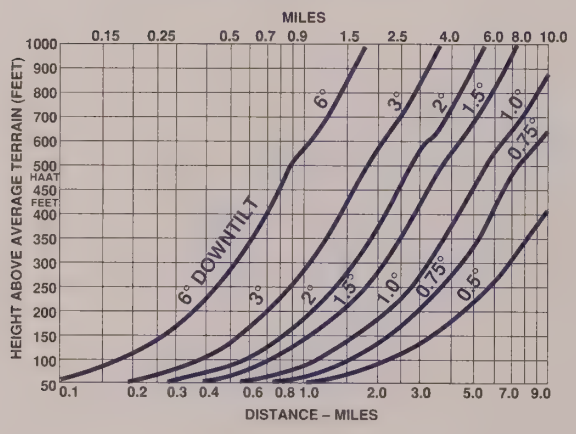


VERTICAL PATTERN
A( )R8
Beam Tilt - 0.75°
Gain (Main Lobe) - 8.0 dB



VERTICAL PATTERN
A( )R10
Beam Tilt - 0.75°
Gain (Main Lobe) - 10.0 dB

DOWNTILT vs. ANTENNA HEIGHT & DISTANCE



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Penetrator™ - For Mobile, Cellular & Paging Applications

806-960 MHz

BMR6*, BMR8* – SMR	806-869 MHz
BCR6*, BCR8* – Cellular	824-894 MHz
BPR6*, BPR8* – Paging	928-960 MHz

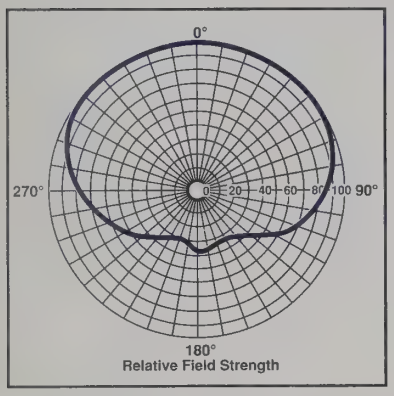
*** Pattern desired (O, A, B, D, H) must be specified after model number.**
U.S. Patent 4,518,969

The novel side fed dipole design of these antennas provides 6 dBd or 8 dBd omnidirectional gain and bandwidth up to 100 MHz. All feature constant beam tilt, heavy null fill, and have been VSWR tested. Depending upon the specific required area of coverage horizontal patterns O, A, B, D or H are available.

PATTERN AND GAIN SPECIFICATIONS

Gain shown is the minimum value over the operating bandwidth.

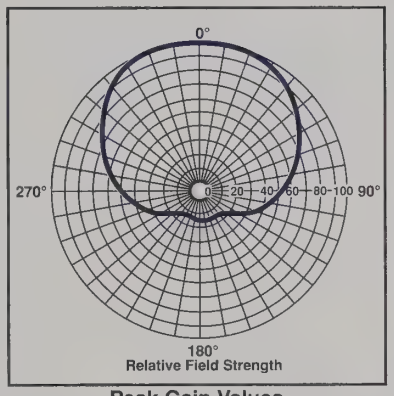
PATTERN A
220° COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMR6A, BCR6A, BPR6A	8.3 dB
BMR8A, BCR8A, BPR8A	10.3 dB

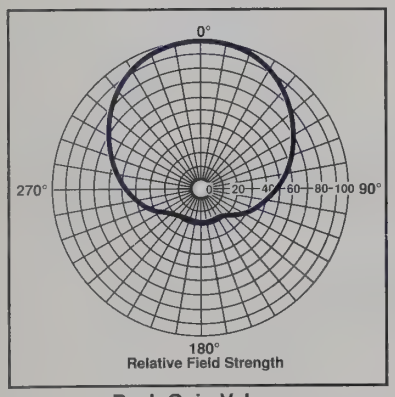
PATTERN B
140° COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMR6B, BCR6B, BPR6B	10.0 dB
BMR8B, BCR8B,BPR8B	12.0 dB

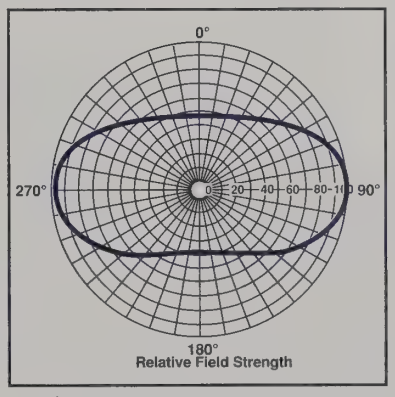
PATTERN D
120° COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMR6D, BCR6D, BPR6D	10.3 dB
BMR8D, BCR8D, BPR8D	12.3 dB

PATTERN H
TWO SECTOR COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMR6H, BCR6H, BPR6H	9.4 dB
BMR8H, BCR8H,BPR8H	11.4 dB

To Order, Specify:
1. Model - BMR, BCR or BPR
2. Gain - 6 or 8 dB
3. Pattern - O, A, B, D or H
4. Mounting Bracket - B1 or B2
   Example: BCR8A-B1

PATTERN O
360° COVERAGE

(Omnidirectional ± 1.5 dB Maximum)

Average Gain Values

Model	Gain (dBd)
BMR6, BCR6,BPR6	6.0 dB
BMR8, BCR8, BPR8	8.0 dB

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Penetrator™ - For Mobile, Cellular & Paging Applications

SPECIFICATIONS

All models are designed to meet or exceed EIA standard RS 329.

ELECTRICAL SPECIFICATIONS

Design Frequency Band - MHz Model BMR Model BCR Model BPR	 806-869 (63 MHz Bandwidth) 824-894 (70 MHz Bandwidth) 928-960 (32 MHz Bandwidth)
Polarization	Vertical
Null Fill	None (standard)
Beam Tilt (Standard)	0.0°
Input VSWR	1.5:1 Maximum
Input Connector	N-female 50 Ohms
Max. Input Power	500 Watts
Lightning Protection	Top Rod Grounded to Base Mount

MECHANICAL SPECIFICATIONS

SERIES 6 MODELS

Length - ft. (m)	5.5 (1.68) Plus Lightning Rod
Diameter - in. (mm)	6-5/8 (168.3)
Weight - lbs. (kg) – Flanged – With B1 Bracket – With B2 Bracket	 26 (11.7) 58 (26.1) 42 (18.9)
Survival Wind Force - psf (100 mph)	50
Max. Wind Shear - lbs. (100 mph)	105
Wind Loading Area - ft.² (m²) Flat Plate Equivalent	 2.1 (0.2)
Mounting	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount
Materials	Aluminium and Fiberglass (Blue Standard)

SERIES 8 MODELS

Length - ft. (m)	8 (2.44) Plus Lightning Rod
Diameter - in. (mm)	6-5/8 (168.3)
Weight - lbs. (kg) – Flanged – With B1 Bracket – With B2 Bracket	 36 (16.2) 68 (30.6) 52 (23.4)
Survival Wind Force - psf (100 mph)	50
Max. Wind Shear - lbs. (100 mph)	150
Wind Loading Area - ft.² (m²) Flat Plate Equivalent	 3.0 (.278)
Mounting	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount
Materials	Aluminium and Fiberglass (Blue Standard)

OPTIONS AVAILABLE

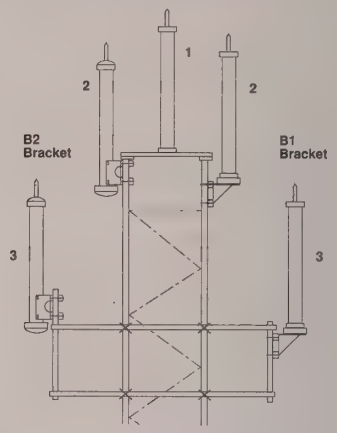
- Coverage of any band up to 100 MHz wide (between 800-960 MHz) with VSWR under 1.5:1
- Design to 160 psf (200 mph) wind survival
- Beam tilt available up to 15°
- Other electrical beam tilt values.
- Large beam tilt without significant gain reduction
- Null fill available for B( )R8
- Power handling to 1000 Watts.

TYPICAL MOUNTING CONFIGURATIONS

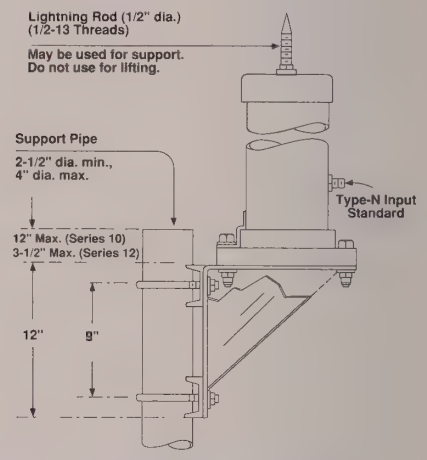
1. FLANGE TOP MOUNT
Mount directly to tower top with eight 3/4" diameter bolts on a 9-1/2" bolt circle. (Flanged units only).

2. TOWER LEG TOP MOUNT
Mount directly to tower leg 2-1/2" to 4" in diameter with antenna above top of tower.

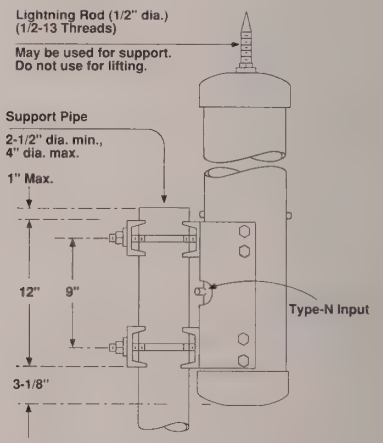
3. VERTICAL POLE SIDE MOUNT
Mount to 2-1/2" to 4"diameter pole.



B1 MOUNTING BRACKET



B2 MOUNTING BRACKET



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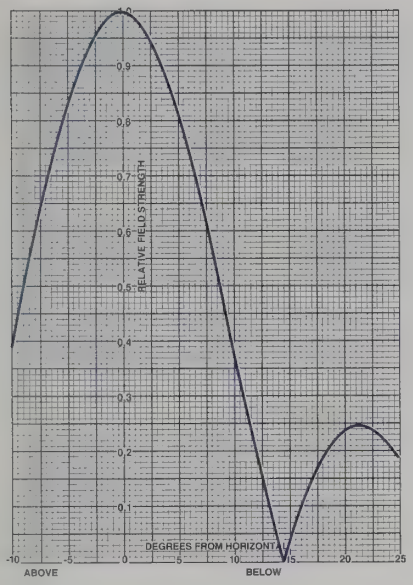
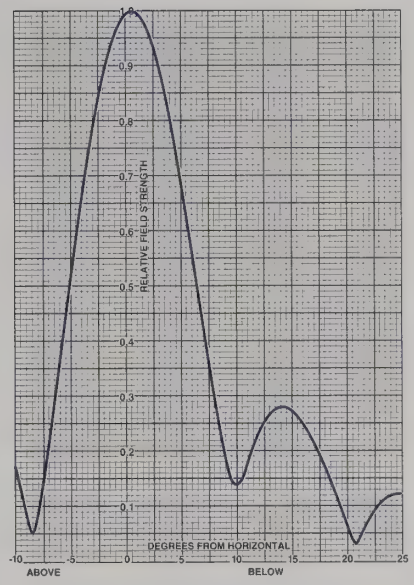
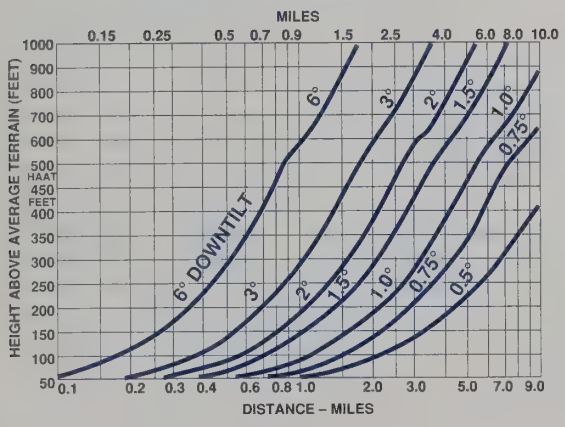


VERTICAL PATTERN
B( )R6
Beam Tilt - 0.0°
Gain (Main Lobe) - 6.0 dB



VERTICAL PATTERN
B( )R8
Beam Tilt - 0.75°
Gain (Main Lobe) - 8.0 dB

DOWNTILT vs. ANTENNA HEIGHT & DISTANCE



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Penetrator™ - For Mobile, Cellular & Paging Applications

806-960 MHz

BMR10*, BMR12* – SMR 806-869 MHz
BCR10*, BCR12* – Cellular 824-894 MHz
BPR10*, BPR12* – Paging 928-960 MHz

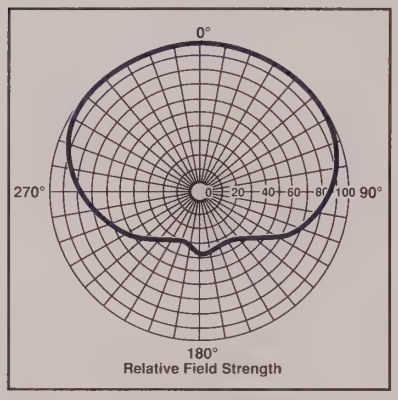
*** Pattern desired (O, A, B, D, H) must be specified after model number.**
U.S. Patent 4,518,969

The novel side fed dipole design of these antennas provides 10 dBd or 12 dBd omnidirectional gain and bandwidth up to 100 MHz. All feature constant beam tilt, heavy null fill, and have been VSWR tested. Depending upon the specific required area of coverage horizontal patterns O, A, B, D or H are available.

PATTERN AND GAIN SPECIFICATIONS

Gain shown is the minimum value over the operating bandwidth.

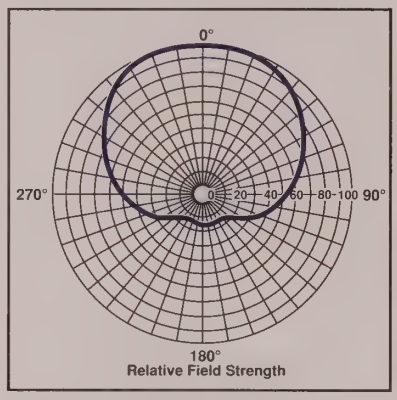
PATTERN A
220° COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMR10A, BCR10A, BPR10A	12.3 dB
BMR12A, BCR12A, BPR12A	14.3 dB

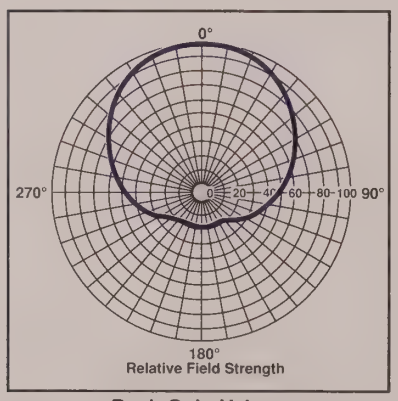
PATTERN B
140° COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMR10B, BCR10B, BPR10B	14.0 dB
BMR12B, BCR12B, BPR12B	16.0 dB

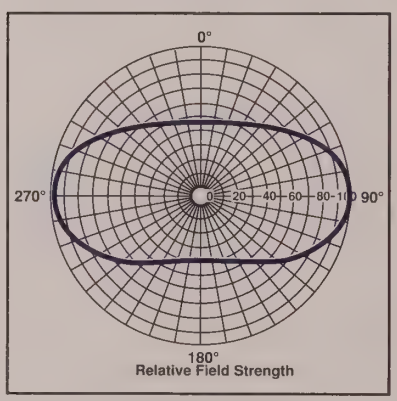
PATTERN D
120° COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMR10D, BCR10D, BPR10D	14.3 dB
BMR12D, BCR12D, BPR12D	16.3 dB

PATTERN H
TWO SECTOR COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMR10H, BCR10H, BPR10H	13.4 dB
BMR12H, BCR12H, BPR12H	15.4 dB

To Order, Specify:
1. Model - BMR, BCR or BPR
2. Gain - 10 or 12 dB
3. Pattern - O, A, B, H or D
4. Mounting Bracket - B1 or B2
(B2 not recommended for 12 dB models)
Example: BMR10A-B1

PATTERN O
360° COVERAGE

(Omnidirectional ± 1.5 dB Maximum)

Average Gain Values

Model	Gain (dBd)
BMR10, BCR10, BPR10	10.0 dB
BMR12, BCR12, BPR12	12.0 dB

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SPECIFICATIONS

All models are designed to meet or exceed EIA standard RS 329.

ELECTRICAL SPECIFICATIONS

Design Frequency Band - MHz Model BMR Model BCR Model BPR	 806-869 (63 MHz Bandwidth) 824-894 (70 MHz Bandwidth) 928-960 (32 MHz Bandwidth)
Polarization	Vertical
Null Fill	Approx. Uniform Signal Strength on Ground From Antenna Site to Horizon.
Beam Tilt (Standard)	-3/4°
Input VSWR	1.5:1 Maximum
Input Connector	N-female 50 Ohms
Max. Input Power	500 Watts
Lightning Protection	Top Rod Grounded to Base Mount

MECHANICAL SPECIFICATIONS
SERIES 10 MODELS

Length - ft. (m)	13 (3.96) Plus Lightning Rod
Diameter - in. (mm)	6-5/8 (168.3)
Weight - lbs. (kg) – Flanged – With B1 Bracket – With B2 Bracket	 55 (24.8) 87 (39.2) 71 (32.0)
Survival Wind Force - psf (100 mph)	50
Max. Wind Shear - lbs. (100 mph)	242
Wind Loading Area - ft.² (m²) Flat Plate Equivalent	 4.8 (.450)
Mounting	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount
Materials	Aluminium and Fiberglass (Blue Standard)

SERIES 12 MODELS

Length - ft. (m)	20 (6.1) Plus Lightning Rod
Diameter - in. (mm)	6-5/8 (168.3)
Weight - lbs. (kg) – Flanged – With B1 Bracket – With B2 Bracket* (100 mph)	 92 (41.4) 124 (55.8) 108 (48.6)
Survival Wind Force - psf (100 mph)	50
Max. Wind Shear - lbs. (100 mph)	380
Wind Loading Area - ft.² (m²) Flat Plate Equivalent	 7.6 (.706)
Mounting Options	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount; 3/4" U-bolt Supplied.
Materials	Aluminium and Fiberglass (Blue Standard)

*B2 Bracket not recommended for 12 dB model.

OPTIONS AVAILABLE

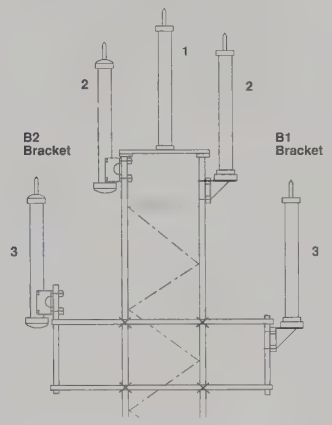
- Coverage of any band up to 100 MHz wide (between 800 and 960 MHz) with VSWR under 1.5:1.
- Design to 160 psf (200 mph) wind survival (13' model only).
- Multiple antennas in one radome (up to six).
- Other electrical beam tilt values.
- Large beam tilt without significant gain reduction.

TYPICAL MOUNTING CONFIGURATIONS

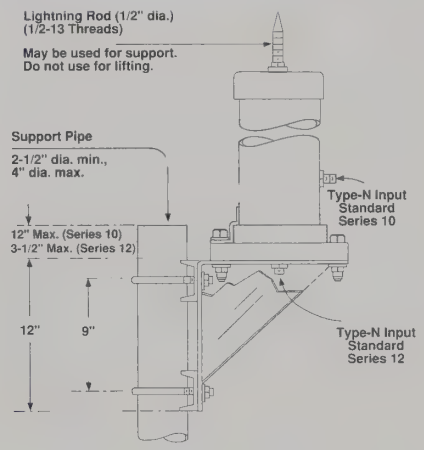
1. FLANGE TOP MOUNT
Mount directly to tower top with eight 3/4" diameter bolts on a 9-1/2" bolt circle. (Flanged units only).

2. TOWER LEG TOP MOUNT
Mount directly to tower leg 2-1/2" to 4" in diameter with antenna above top of tower.

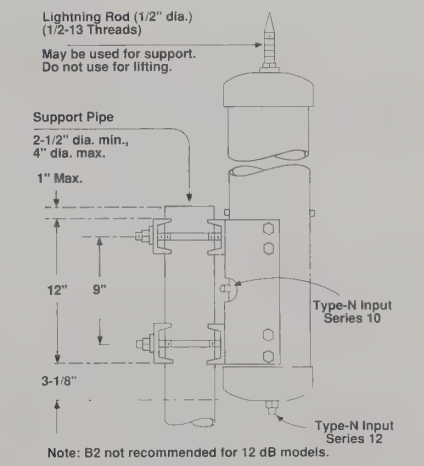
3. VERTICAL POLE SIDE MOUNT
Mount to 2-1/2" to 4"diameter pole.



B1 MOUNTING BRACKET


Lightning Rod (1/2" dia.) (1/2-13 Threads)
May be used for support. Do not use for lifting.
Support Pipe
2-1/2" dia. min., 4" dia. max.
Type-N Input Standard Series 10
12" Max. (Series 10)
3-1/2" Max. (Series 12)
12"
9"
Type-N Input Standard Series 12

B2 MOUNTING BRACKET



Note: B2 not recommended for 12 dB models.

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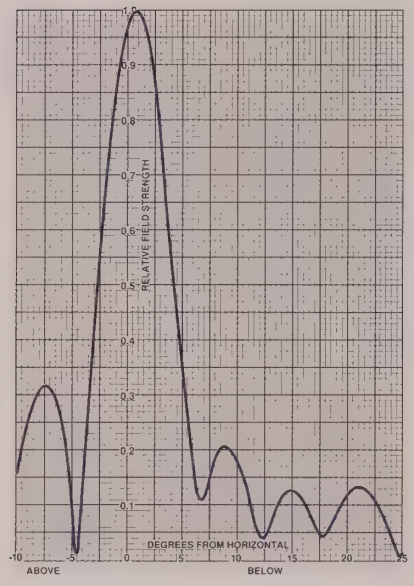
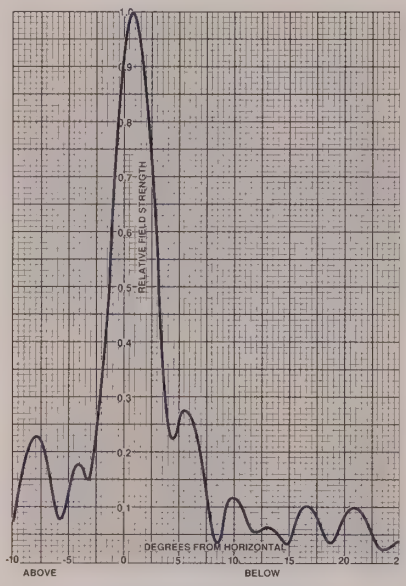
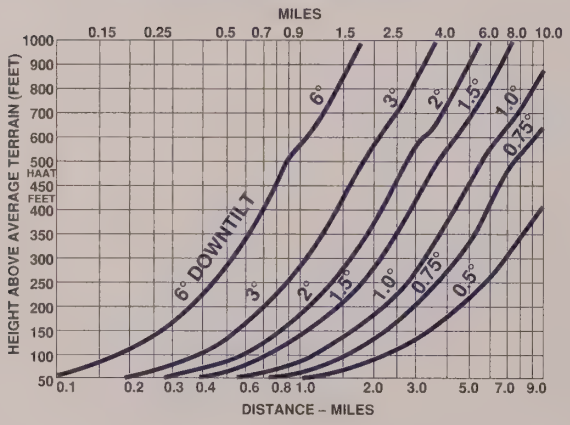


VERTICAL PATTERN
B( )R10
Beam Tilt - 0.75°
Gain (Main Lobe) - 10.0 dB



VERTICAL PATTERN
B( )R12
Beam Tilt - 0.75°
Gain (Main Lobe) - 12.0 dB

DOWNTILT vs. ANTENNA HEIGHT & DISTANCE



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The Penetrator™ - For Multiple Service Applications

806-950 MHz

BMS10* 806-906, 850-950 MHz
BMS12* 806-906, 850-950 MHz

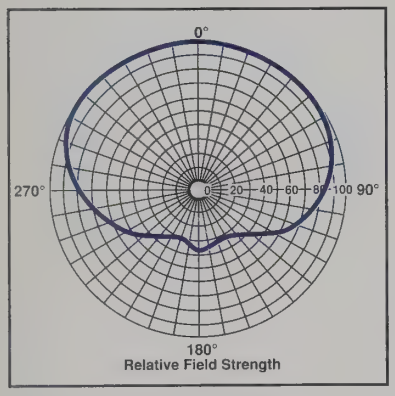
*** Pattern desired (O, A, B, D, H) and frequency must be specified after model number. U.S. Patent 4,518,969.**

These antennas have been specifically designed for wide band, multiservice coverage with either 10 dBd or 12 dBd omnidirectional gain over the entire bandwidth. Depending on the specific required area of coverage, horizontal patterns O, A, B, D, or H are available.

PATTERN AND GAIN SPECIFICATIONS

Gain shown is the minimum value over the operating bandwidth.

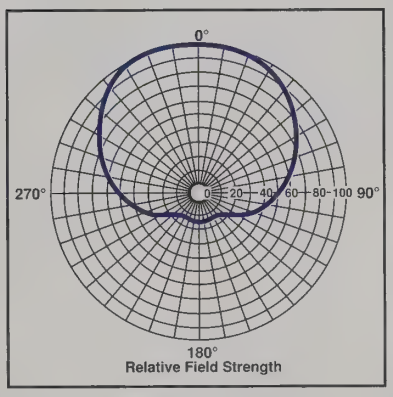
PATTERN A
220° COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMS10A	12.3 dB
BMS12A	14.3 dB

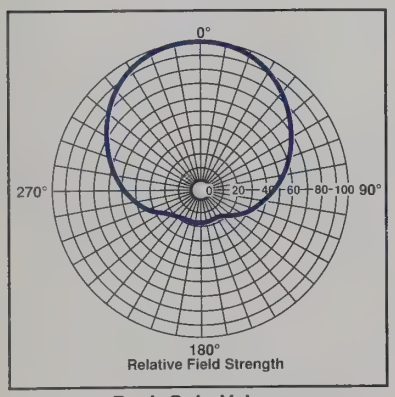
PATTERN B
140° COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMS10B	14.0 dB
BMS12B	16.0 dB

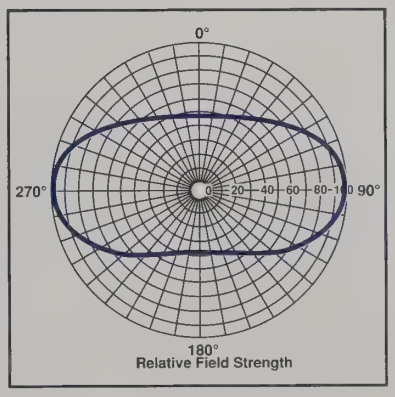
PATTERN D
120° COVERAGE



Peak Gain Values

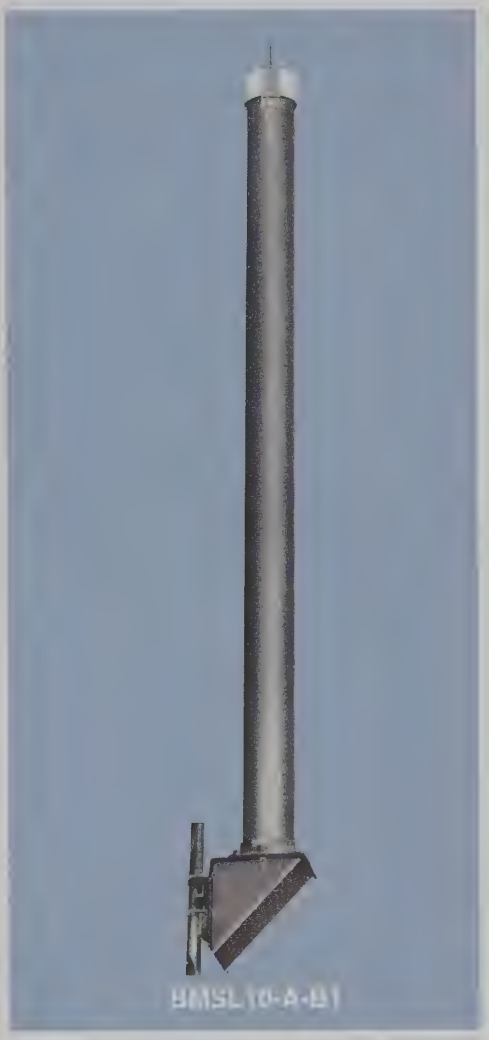
Model	Gain (dBd)
BMS10D	14.3 dB
BMS12D	16.3 dB

PATTERN H
TWO SECTOR COVERAGE



Peak Gain Values

Model	Gain (dBd)
BMS10H	13.4 dB
BMS12H	15.4 dB



To Order, Specify:

1. Model - BMS
2. Frequency - 806-906 MHz (Specify "L")
   850-960 MHz (Specify "U")
3. Gain - 10 or 12 dB
4. Pattern - O, A, B, D or H
5. Mounting Bracket - B1 or B2
   (B2 not recommended for 12 dB model)

Example: BMSL10-A-B1

PATTERN O
360° COVERAGE

(Omnidirectional ± 1.5 dB Maximum)

Average Gain Values

Model	Gain (dBd)
BMS10	10.0 dB
BMS12	12.0 dB

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The Penetrator™ - For Multiple Service Applications

SPECIFICATIONS

All models are designed to meet or exceed EIA standard RS 329.

ELECTRICAL SPECIFICATIONS

Design Frequency Band - MHz Model BMS-L BMS-U	 806-906 (100 MHz Bandwidth) 850-960 (110 MHz Bandwidth)
Polarization	Vertical
Null Fill	Approx. Uniform Signal Strength on Ground From Antenna Site to Horizon.
Beam Tilt (Standard)	-3/4°
Input VSWR	1.5:1 Maximum*
Input Connector	N-female 50 Ohms
Max. Input Power	500 Watts
Lightning Protection	Top Rod Grounded to Base Mount

*VSWR may go to 1.6:1 above 950 MHz

MECHANICAL SPECIFICATIONS SERIES 10 MODELS

Length - ft. (m)	13 (3.96) Plus Lightning Rod
Diameter - in. (mm)	6-5/8 (168.3)
Weight - lbs. (kg) – Flanged – With B1 Bracket – With B2 Bracket	 55 (24.8) 87 (39.2) 71 (32.0)
Survival Wind Force - psf (100 mph)	50
Max. Wind Shear - lbs. (100 mph)	242
Wind Loading Area - ft.² (m²) Flat Plate Equivalent	 4.8 (.450)
Mounting	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount
Materials	Aluminium and Fiberglass (Blue Standard)

SERIES 12 MODELS

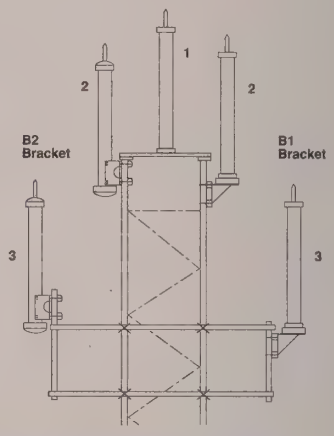
Length - ft. (m)	20 (6.1) Plus Lightning Rod
Diameter - in. (mm)	6-5/8 (168.3)
Weight - lbs. (kg) – Flanged – With B1 Bracket – With B2 Bracket (100 mph)	 92 (41.4) 124 (55.8) 108 (48.6)
Survival Wind Force - psf (100 mph)	50
Max. Wind Shear - lbs. (100 mph)	380
Wind Loading Area - ft.² (m²) Flat Plate Equivalent	 7.6 (.706)
Mounting Options	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount; 3/4" U-bolt Supplied.
Materials	Aluminium and Fiberglass (Blue Standard)

OPTIONS AVAILABLE

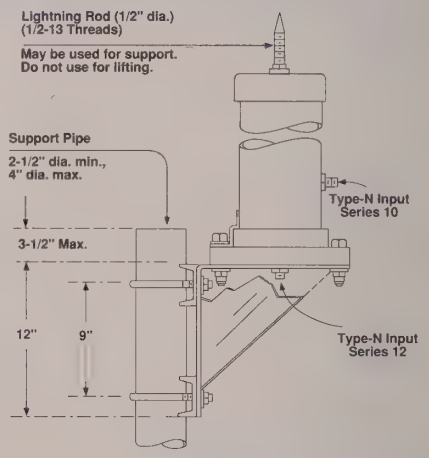
- Coverage of any band up to 100 MHz wide (between 800 and 960 MHz) with VSWR under 1.5:1.
- Design to 160 psf (200 mph) wind survival (13' model only)
- Multiple antennas in one radome (up to six).
- Other electrical beam tilt values.
- Large beam tilt without significant gain reduction.

TYPICAL MOUNTING CONFIGURATIONS

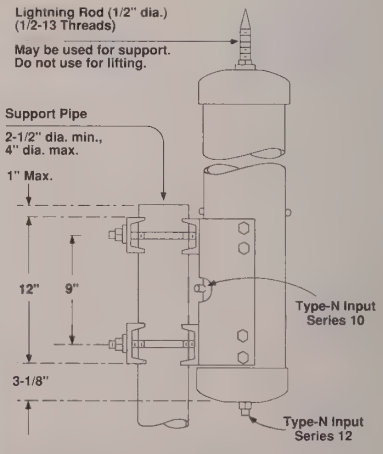
1. FLANGE TOP MOUNT
Mount directly to tower top with eight 3/4" diameter bolts on a 9-1/2" bolt circle. (Flanged units only).
2. TOWER LEG TOP MOUNT
Mount directly to tower leg 2-1/2" to 4" in diameter with antenna above top of tower.
3. VERTICAL POLE SIDE MOUNT
Mount to 2-1/2" to 4"diameter pole.



B1 MOUNTING BRACKET


Lightning Rod (1/2" dia.) (1/2-13 Threads)
May be used for support. Do not use for lifting.
Support Pipe
2-1/2" dia. min., 4" dia. max.
Type-N Input Series 10
3-1/2" Max.
12"
9"
Type-N Input Series 12

B2 MOUNTING BRACKET



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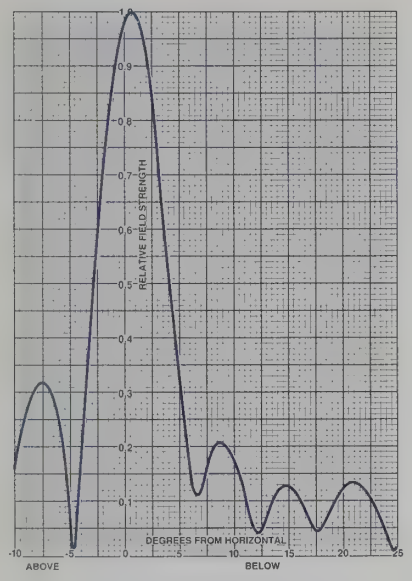
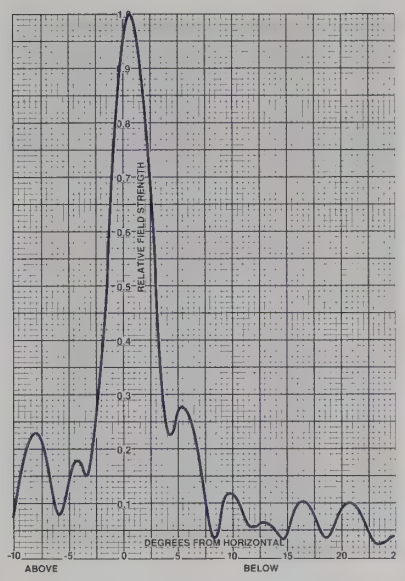
The Penetrator™ - For Multiple Service Applications

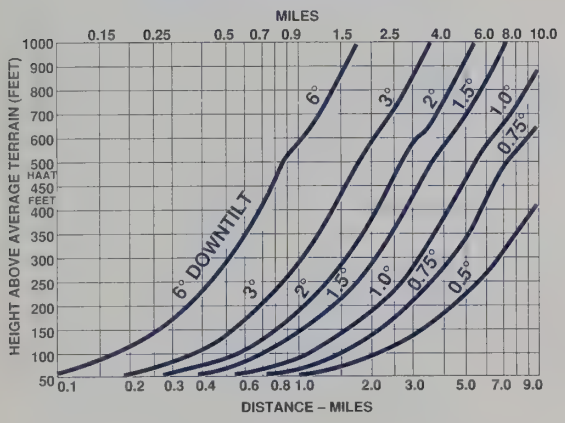


VERTICAL PATTERN
BMS( )10
Beam Tilt - 0.75°
Gain (Main Lobe) - 10.0 dB



VERTICAL PATTERN
BMS( )12
Beam Tilt - 0.75°
Gain (Main Lobe) - 12.0 dB

DOWNTILT vs. ANTENNA HEIGHT & DISTANCE



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Penetrator™ - Dual Models for Cellular, Mobile & Paging Applications

806-960 MHz

BMR8/6* – SMR	806-869 MHz
BCR8/6* – Cellular	824-894 MHz
BPR8/6* – Paging	928-960 MHz

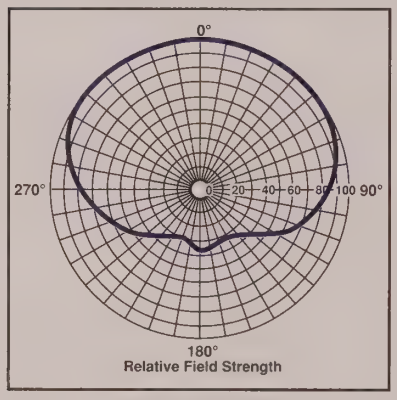
*** Pattern desired (O, A, B, D, H) must be specified after model number.**
U.S. Patent 4,518,969

These dual models feature two antennas of up to 100 MHz bandwidth in one weatherproof radome. Omnidirectional gain of 8 and 6 dBd is standard while horizontal patterns O, A, B, D, or H provide the maximum gains listed below.

PATTERN AND GAIN SPECIFICATIONS

Gain shown is the minimum value over the operating bandwidth.

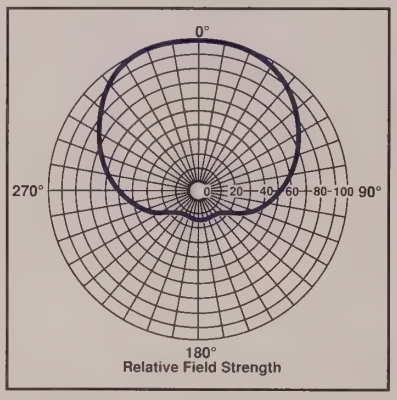
PATTERN A
220° COVERAGE



Peak Gain Values

Model	Gain (dBd)	
BMR8/6A	10.3 dB	8.3 dB
BCR8/6A	10.3 dB	8.3 dB
BPR8/6A	10.3 dB	8.3 dB

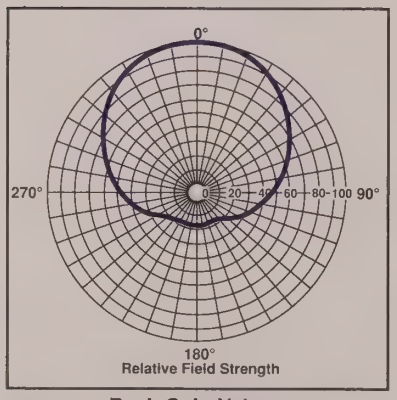
PATTERN B
140° COVERAGE



Peak Gain Values

Model	Gain (dBd)	
BMR8/6B	12.0 dB	10.0 dB
BCR8/6B	12.0 dB	10.0 dB
BPR8/6B	12.0 dB	10.0 dB

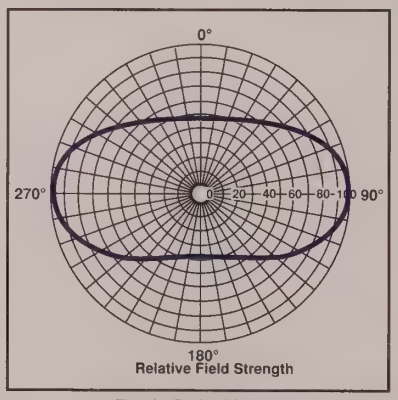
PATTERN D
120° COVERAGE



Peak Gain Values

Model	Gain (dBd)	
BMR8/6D	12.3 dB	10.3 dB
BCR8/6D	12.3 dB	10.3 dB
BPR8/6D	12.3 dB	10.3 dB

PATTERN H
TWO SECTOR COVERAGE



Peak Gain Values

Model	Gain (dBd)	
BMR8/6H	11.4 dB	9.4 dB
BCR8/6H	11.4 dB	9.4 dB
BPR8/6H	11.4 dB	9.4 dB

To Order, Specify:
1. Model - BMR, BCR or BPR
2. Gain - 8/6 dB
3. Pattern - O, A, B, D or H
4. Mounting Bracket - B1 or B2

Example: BMR8/6H-B1

PATTERN O
360° COVERAGE

(Omnidirectional ± 1.5 dB Maximum)

Average Gain Values

Model	Gain (dBd)
BMR8/6, BCR8/6, BPR8/6	8 dB 6 dB

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Penetrator™ - Dual Models for Cellular, Mobile & Paging Applications

SPECIFICATIONS

All models are designed to meet or exceed EIA standard RS 329.

ELECTRICAL SPECIFICATIONS

Design Frequency Band - MHz Model BMR Model BCR Model BPR	 806-869 (63 MHz Bandwidth) 824-894 (70 MHz Bandwidth) 928-960 (32 MHz Bandwidth)
Polarization	Vertical
Null Fill	None (Standard)
Beam Tilt (Standard)	0°
Input VSWR	1.5:1 Maximum
Input Connector	N-female 50 Ohms
Max. Input Power	500 Watts
Lightning Protection	Top Rod Grounded to Base Mount

Note: Isolation between antennas greater than 30 dB.

MECHANICAL SPECIFICATIONS

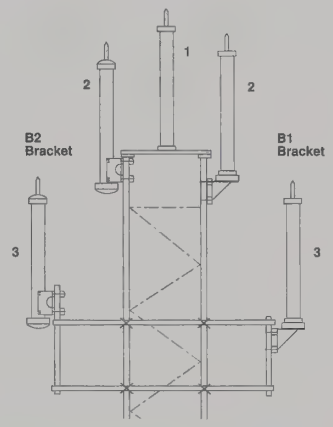
Length - ft. (m)	13 (3.96) Plus Lightning Rod
Diameter - in. (mm)	6-5/8 (168.3)
Weight - lbs. (kg) – Flanged – With B1 Bracket – With B2 Bracket	 55 (24.8) 87 (39.2) 71 (32.0)
Survival Wind Force - psf (100 mph)	50
Max. Wind Shear - lbs. (100 mph)	242
Wind Loading Area - ft.² (m²) Flat Plate Equivalent	 4.8 (.450)
Mounting Options	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount
Materials	Aluminium and Fiberglass (Blue Standard)

OPTIONS AVAILABLE

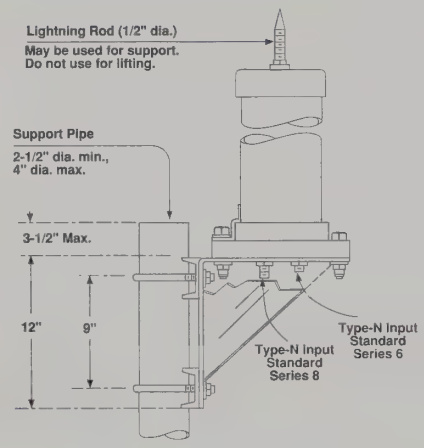
- Coverage of any band up to 100 MHz wide (between 800-960 MHz) with VSWR under 1.5:1
- Design to 160 psf (200 mph) wind survival
- Other electrical beam tilt values
- Large beam tilt without significant gain reduction
- Null fill available for B( )R8.
- Power handling to 1000 Watts.

TYPICAL MOUNTING CONFIGURATIONS

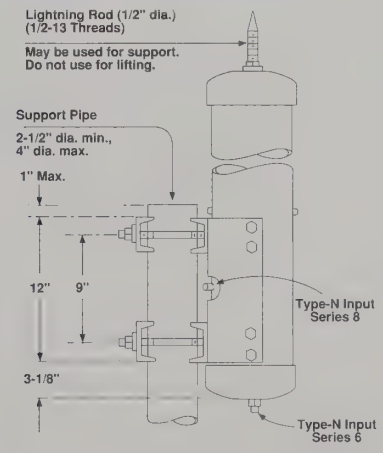
1. FLANGE TOP MOUNT
Mount directly to tower top with eight 3/4" diameter bolts on a 9-1/2" bolt circle. (Flanged units only).
2. TOWER LEG TOP MOUNT
Mount directly to tower leg 2-1/2" to 4" in diameter with antenna above top of tower.
3. VERTICAL POLE SIDE MOUNT
Mount to 2-1/2" to 4"diameter pole.



B1 MOUNTING BRACKET



B2 MOUNTING BRACKET



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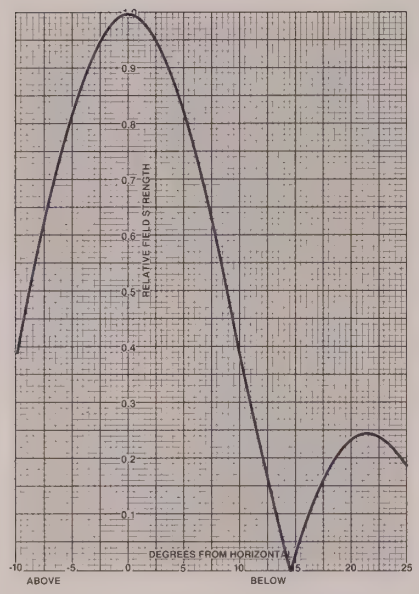
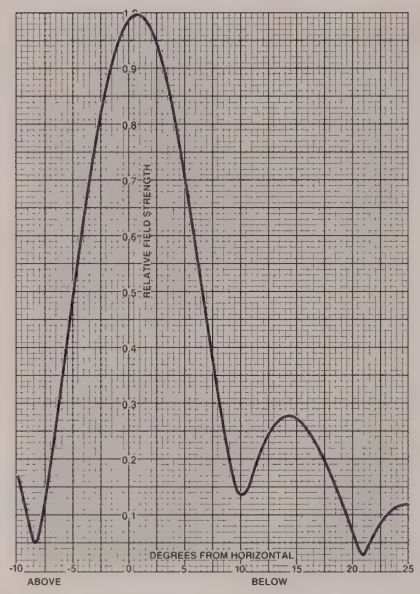
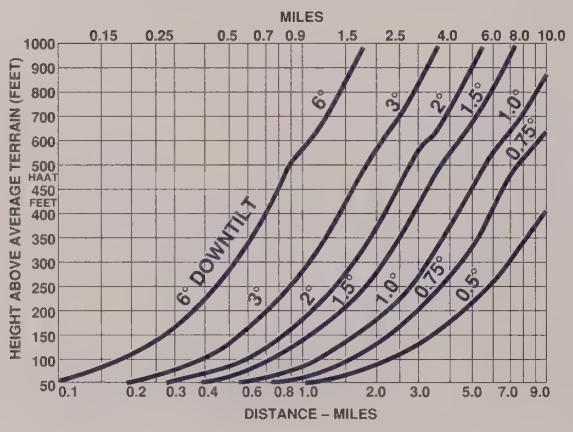


VERTICAL PATTERN
B( )R6
Beam Tilt - 0.0°
Gain (Main Lobe) - 6.0 dB



VERTICAL PATTERN
B( )R8
Beam Tilt - 0.75°
Gain (Main Lobe) - 8.0 dB

DOWNTILT vs. ANTENNA HEIGHT & DISTANCE



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806-960 MHz

BMR10/8* – SMR	806-869 MHz
BCR10/8* – Cellular	824-894 MHz
BPR10/8* – Paging	928-960 MHz

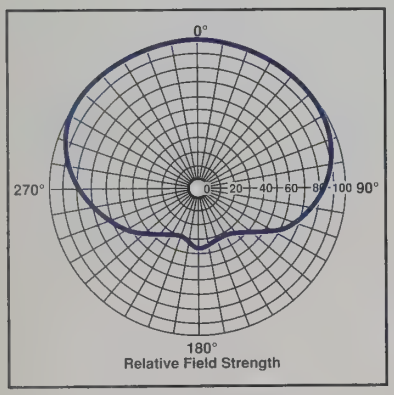
*** Pattern desired (O, A, B, D, H) must be specified after model number.**
U.S. Patent 4,518,969

These dual models feature two antennas of up to 100 MHz bandwidth in one weatherproof radome. Omnidirectional gain of 8 and 10 dBd is standard while horizontal patterns O, A, B, D, or H provide the maximum gains listed below.

PATTERN AND GAIN SPECIFICATIONS

Gain shown is the minimum value over the operating bandwidth.

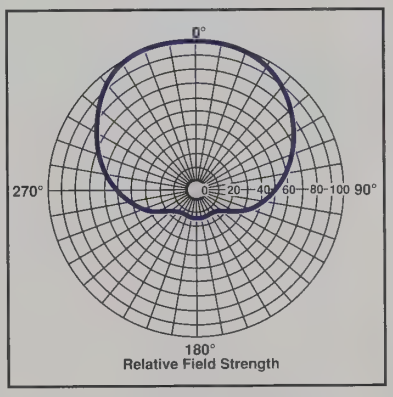
PATTERN A
220° COVERAGE



Peak Gain Values

Model	Gain (dBd)	
BMR10/8A	12.3 dB	10.3 dB
BCR10/8A	12.3 dB	10.3 dB
BPR10/8A	12.3 dB	10.3 dB

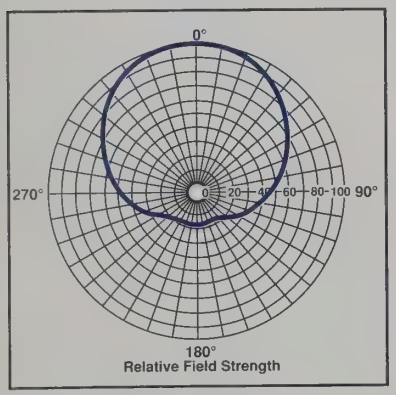
PATTERN B
140° COVERAGE



Peak Gain Values

Model	Gain (dBd)	
BMR10/8B	14.0 dB	12.0 dB
BCR10/8B	14.0 dB	12.0 dB
BPR10/8B	14.0 dB	12.0 dB

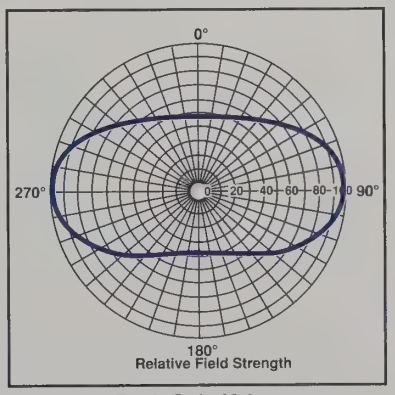
PATTERN D
120° COVERAGE



Peak Gain Values

Model	Gain (dBd)	
BMR10/8D	14.3 dB	12.3dB
BCR10/8D	14.3 dB	12.3dB
BPR10/8D	14.3 dB	12.3dB

PATTERN H
TWO SECTOR COVERAGE



Peak Gain Values

Model	Gain (dBd)	
BMR10/8H	13.4 dB	11.4 dB
BCR10/8H	13.4 dB	11.4 dB
BPR10/8H	13.4 dB	11.4 dB

To Order, Specify:

1. Model - BMR, BCR or BPR
2. Gain - 10/8 dB
3. Pattern - O, A, B, D or H
4. Mounting Bracket - B1

Example: BMR10/8A-B1

PATTERN O
360° COVERAGE

(Omnidirectional ± 1.5 dB Maximum)

Average Gain Values

Model	Gain (dBd)	
BMR10/8, BCR10/8, BPR10/8	10 dB	8 dB

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SPECIFICATIONS

All models are designed to meet or exceed EIA standard RS 329.

ELECTRICAL SPECIFICATIONS

Design Frequency Band - MHz Model BMR10/8 Model BCR10/8 Model BPR10/8	 806-869 (63 MHz Bandwidth) 824-894 (70 MHz Bandwidth) 928-960 (32 MHz Bandwidth)
Polarization	Vertical
Null Fill 10 dB, 8 dB	Approx. Uniform Signal Strength on Ground From Antenna Site to Horizon.
Beam Tilt (Standard) 10 dB, 8 dB	-3/4°
Input VSWR	1.5:1 Maximum Each Input
Input Connector	N-female Each Input
Max. Input Power	500 Watts Each

Note: Isolation between antennas greater than 30 dB.

MECHANICAL SPECIFICATIONS

Length - ft. (m)	20 (6.1) Plus Lightning Rod
Diameter - in. (mm)	6-5/8 (168.3)
Weight - lbs. (kg) – Flanged – With B1 Bracket – With B2 Bracket* (100 mph)	 92 (41.4) 124 (55.8) 108 (48.6)
Survival Wind Force - psf (100 mph)	50
Max. Wind Shear - lbs. (100 mph)	380
Wind Loading Area - ft.² (m²) Flat Plate Equivalent	 7.6 (.706)
Mounting Options	Flange Top Mount, Tower Leg Mount, Vertical Pole Side Mount; 3/4" U-Bolt Hardware Supplied
Materials	Aluminium and Fiberglass (Blue Standard)

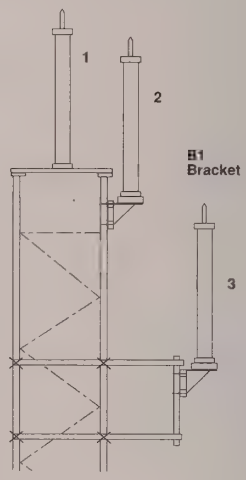
* B2 bracket not recommended for this model.

OPTIONS AVAILABLE

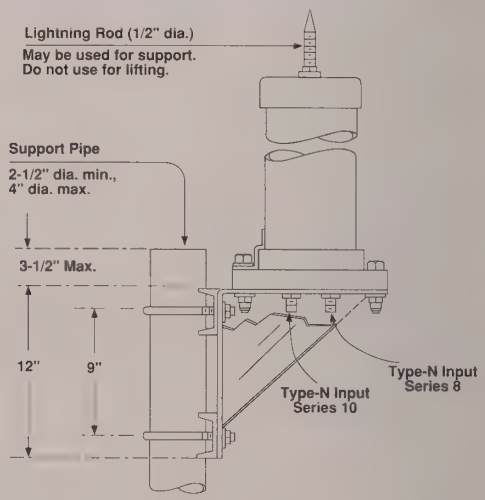
- Other values and customer adjustable tilt on 10 dB antenna.
- Power handling to 3000 Watts.
- Null fill available for B( )R8.
- Beam tilt available for B( )R8.
- Coverage of any band up to 100 MHz wide (between 800-960 MHz) with VSWR under 1.5:1

TYPICAL MOUNTING CONFIGURATIONS

1. FLANGE TOP MOUNT
Mount directly to tower top with eight 3/4" diameter bolts on a 9-1/2" bolt circle. (Flanged units only).
2. TOWER LEG TOP MOUNT
Mount directly to tower leg 2-1/2" to 4" in diameter with antenna above top of tower.
3. VERTICAL POLE SIDE MOUNT
Mount to 2-1/2" to 4"diameter pole.



B1 MOUNTING BRACKET



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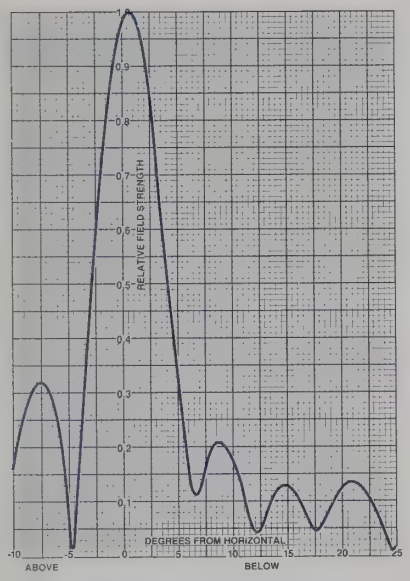
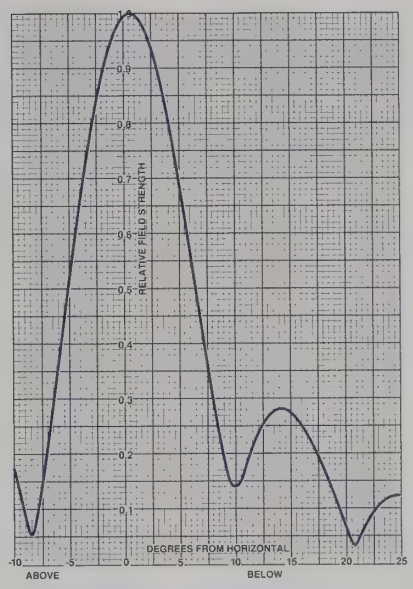
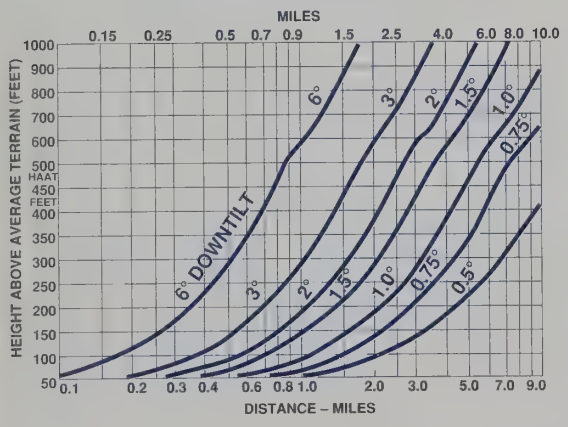


VERTICAL PATTERN
B( )R10
Beam Tilt - 0.75°
Gain (Main Lobe) - 10.0 dB



VERTICAL PATTERN
B( )R8
Beam Tilt - 0.75°
Gain (Main Lobe) - 8.0 dB

DOWNTILT vs. ANTENNA HEIGHT & DISTANCE



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Antenna Mounting Hardware

Clamps Sets, Crossover Plates, Wall Mounts, Pole Mounts

PD46 - Heavy Duty Universal Clamp Set. Mounts antennas equipped with 1 in. (25 mm) to 2-3/4 in. (70 mm) diameter support pipes on structures having 1 in. (25 mm) to 2-3/4 in. (70 mm) diameter support pipes and angle members 2 in. (51 mm) by 2 in. (51 mm). Net weight 9 lbs. (4.08 kg). Shipping volume 0.053 ft.^{3} (0.0015 m^3). UPS shippable.

PD346 - Heavy Duty Universal Clamp Set (large). Same as PD46 except mounts antennas equipped with 2-3/8 in. (60 mm) to 4 in. (102 mm) diameter support pipes on structures having 2-3/8 in. (60 mm) to 4 in. (201 mm) diameter support pipes and angle members 3 in. (76 mm) by 3 in. (76 mm). Net wt. 16 lbs. (7.26 kg). Shipping volume 0.22 ft.^{3} (0.006 m^3). UPS shippable.

PD46A - Clamp Set. Supplied with most side mounting hardware. Used to clamp antenna support pipe directly to each of two grounded lower support arms. Consists of two flat and two wrinkled plates, four hexbolts, eight nuts and lockwashers. Net wt. 5 lbs. (2.37 kg). Shipping volume .046 ft.^{3} (.0013 m^3). UPS shippable.

PD89 - Universal Clamp. One half of a PD46 Universal Clamp Set. Used as top support when side mounting a PD1132, PD1132-D and PD10021 antenna or as replacement hardware for PD10022 antenna. Net wt. 5 lbs. (2.27 kg). Shipping volume .053 ft.^{3} (.0015 m^3). UPS shippable.

PD241 - Universal Clamp Set. Mounts antennas equipped with 1 in. (25 mm) to 2-3/4 in. (70 mm) diameter support pipes on flat vertical surfaces. Net wt. 6 lbs. (2.72 kg). Shipping volume 0.07 ft.^{3} (0.022 m^3). UPS shippable.

PD246 - Universal Clamp Set. Mounts antennas equipped with 1 in. (25 mm) to 2-3/4 in. (70 mm) diameter support pipes on wood utility poles. Adjusts for pole taper. Mounting holes are 15/16 in. (24 mm) diameter for 7/8 in. (22 mm) threaded crossarm rods. Bushings furnished reduced for 5/8 in. (16 mm) diameter lag screws. Crossarm rods or lag screws not furnished. Net wt. 6 lbs. (2.72 kg). Shipping volume 0.07 ft.^{3} (0.002 m^3). UPS shippable.

PD10064 - Wall Mounting Hardware for PD1132 and PD10021 directional antennas. An 8 in. (203 mm) square stainless steel plate provides four positions of wall attachment. Two galvanized U-bolts are provided to secure the antenna's support pipe. The PD10064 has 3-1/4 in. (82.5 mm) of standoff allowing the antenna to be directed/rotated 130 degrees. Three (3) PD10064 are suggested per antenna. Net wt. 8 lbs. (3.63 kg). Shipping volume .317 ft.^{3} (.0090 m^3). UPS shippable.

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Antenna Mounting Hardware

PD1253 - Mounting Hardware for mounting PD10054, PD10085L, PD10175, PD10177, PD10178, PD10188, PD10189, PD10197, PD10200, PD10186, PD10099, PD10055, PD10084, PD10085 and PD10176 antennas to support structures having diameters from 1-3/4 in. (44 mm) to 4 in. (102 mm). Net wt 2 lbs. (.91 kg). Shipping volume .20 ft.^{3} (0.006 m^3). UPS shippable.

PD1255 - Same as PD1253 except includes bracket for mounting PD10176 to non-AMP structures.

PD237 - Universal Crossover Clamp Assembly. This assembly is furnished with all required U-bolts for securing any combination of two intersecting pipes of the following sizes: 1-5/16 in. (49 mm) O.D., 1-15/16 in. (49 mm) and 2-3/8 in. (60 mm) O.D. Net wt. 6 lbs. (2.72 kg.). Shipping volume 0.06 ft.^{3} (0.002 m^3). UPS shippable.

PD10087 - Large Universal Crossover Clamp Assembly. Similar to our PD237 except that it mounts a 2-3/8 inch (60 mm) diameter pipe to tower structures with 3 inch (76 mm), 4 inch (102 mm) or 5 inch (127 mm) diameters. This assembly is furnished with all required U-bolts. Net wt. 16 lbs. (7.26 kg). Shipping volume .20 ft.^{3} (.006 m^3). UPS shippable.

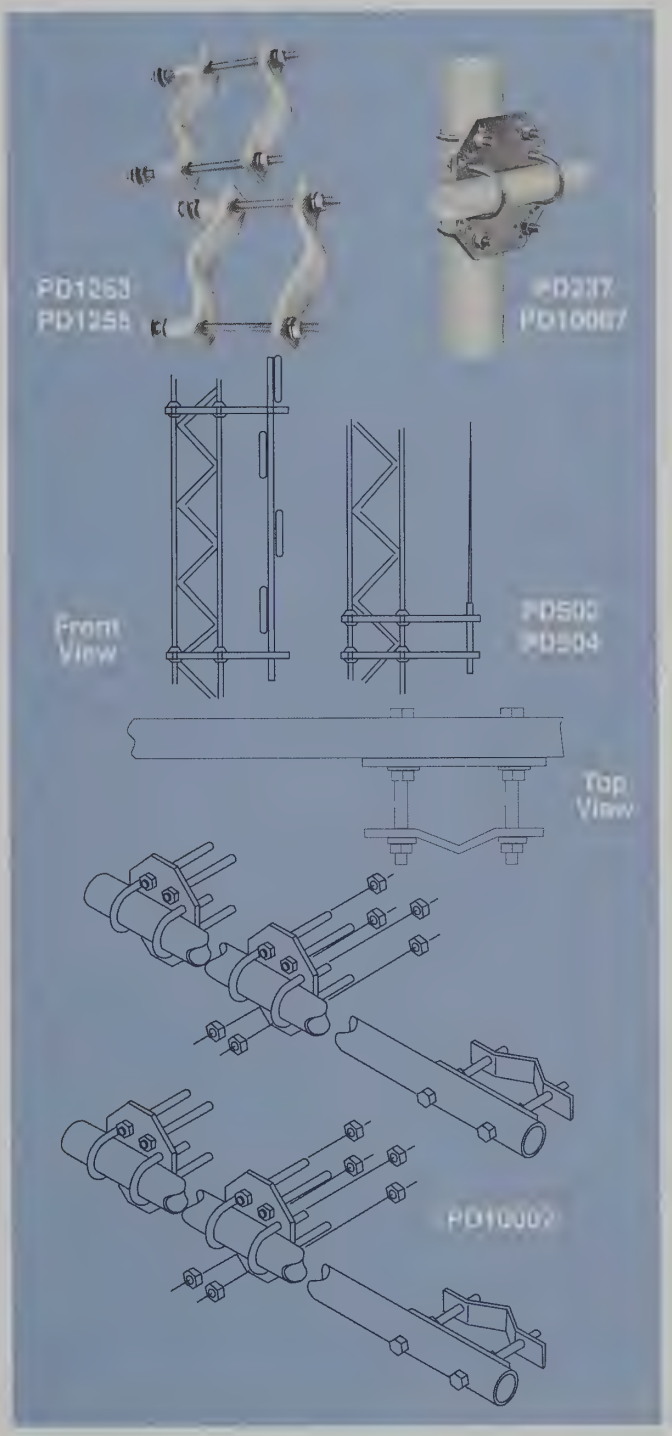
Side Mounting Assemblies

PD502 - Side Mounting Assembly. Mounts the PD83, PD114, PD128, PD152, PD207, PD340, PD345, PD440, PD453, PD206, PD1500 and PD1107 antennas on square or triangular towers having legs up to 2-3/8 in. (60 mm) in. diameter. Consists of a single grounded upper support and a single grounded lower support. These components are assembled using four (4) PD237 crossover plates and one (1) PD46A clamp set (supplied). The PD502 Side Mounting Kit mounts the antenna 6 in. (152 mm) to 3 ft. (0.91 m) away from a tower having face dimensions ranging between 1 ft. (0.3 m) and 2 ft. 0.6 m). Net wt. 32 lbs. (14.52 kg). Shipping volume 1.38 ft.^{3} (0.39 m^3). UPS shippable.

PD504 - Side Mounting Assembly. Same as PD502 except mounts antennas 6 in. (152 mm) to 7 ft. (2.1 m) away from a tower. Net wt. 32 lbs. (14.52 kg). Shipping volume 2.25 ft.^{3} (.064 m^3). Cannot be used with PD340 and PD345.

PD10002 - Side Mounting Assembly. Consists of dual grounded support system. Mounts PD1610, and PD10022 antennas 6 in. (152 mm) to 3 ft. (0.91 m) away from a tower having round legs up to 2-3/8 in. (60 mm) diameter. Net wt. 32 lbs. (14.52 kg). Shipping volume 1.38 ft.^{3} (0.039 m^3). UPS shippable.

Note: Most antennas are supplied with mounting hardware. Should additional hardware be required, a selection may be made from the items shown above. All are UPS shippable.



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Antenna Mounting Hardware

PD402 - Side Mounting Assembly. Designed for mounting PD201, PD10036 and PD10036DT Stationmaster™ Antennas on square or triangular towers having round legs up to 2-3/8 in. 60 mm) in diameter. Consists of a single grounded lower support and an insulated upper support arm. These components are assembled using five (5) PD237 crossover plates (supplied). The assembly mounts antennas 6 in. (152 mm) to 3 ft. (0.91 m) away from a tower, having face dimensions ranging between 1 ft. (0.3 m) and 2 ft. (0.6 m). Net wt. 21 lbs. (9.53 kg). Shipping volume 1.38 ft.^{3} (0.39 m^3). UPS shippable. See Fig. 1.

PD403 - Side Mounting Assembly. Same as PD402 except mounts PD201, PD10036 and PD10036DT antenna, 6 in. (152 mm) to 7 ft. (2.1 m) away from a tower. Net wt. 40 lbs. (18.14 kg). Shipping volume 2.16 ft.^{3} (.061 m^3). See Fig. 1.

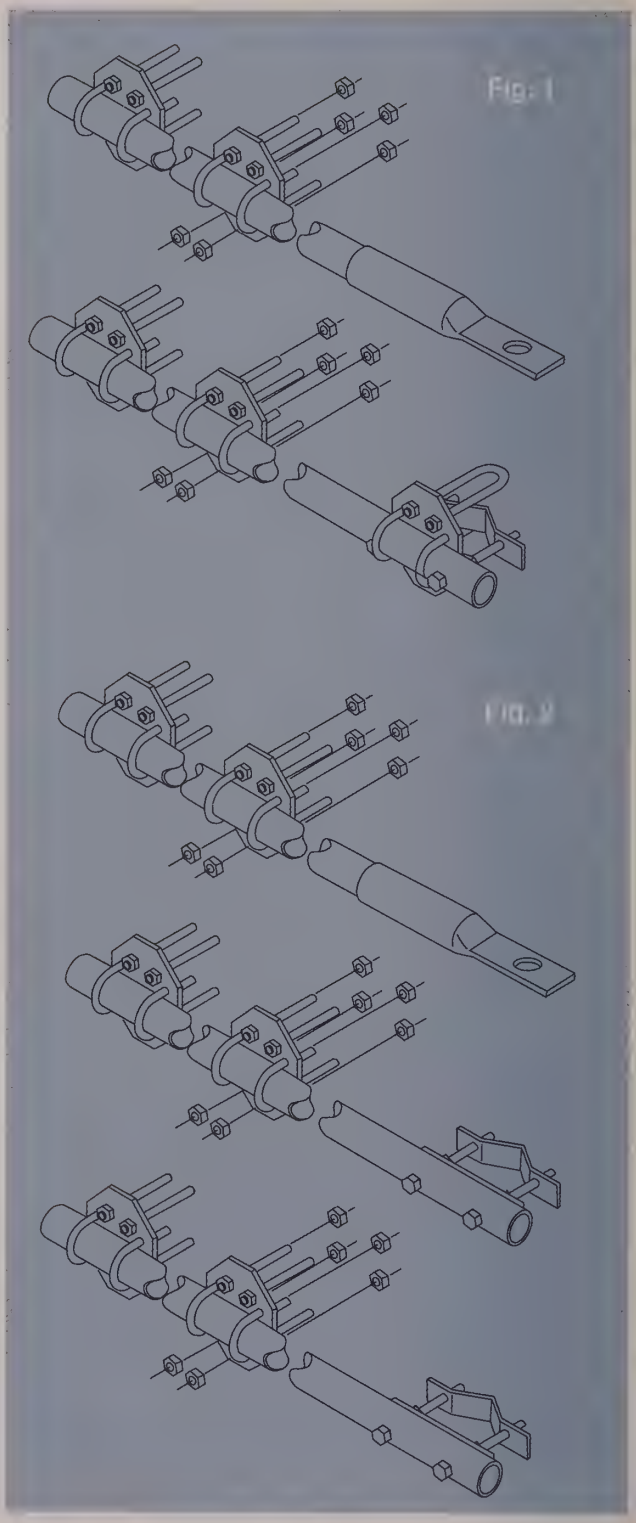
PD302 - Side Mounting Assembly. Designed for mounting the PD200, PD399, PD400, PD10037 or PD10037DT Stationmaster™ Antenna on square or triangular towers having round legs up to 2-3/8 in. (60 mm) in diameter. Consists of a dual grounded lower support system and an insulated upper support arm. These components are assembled using six (6) PD237 crossover plates and one (1) PD46A clamp set, (supplied). PD302 Side Mounting Assembly mounts antennas from 6 in. (152 mm) to 3 ft. (0.91 m) away from a tower having face dimensions ranging between 1 ft. (0.3 m) and 2 ft. (0.6 m). Net wt. 37 lbs. (16.78 kg) Shipping volume 1.38 ft.^{3} (0.39 m^3). UPS shippable. See Fig. 2.

PD303 - Side Mounting Assembly. Same as PD302 except mounts PD200, PD399, PD10037, or PD10037DT antennas from 6 in. (152 mm) to 7 ft. (2.1 m) away from a tower. Net wt. 55 lbs. (24.95 kg). Shipping volume 2.16 ft.^{3} (.061 m^3). See Fig. 2.

PD503 - Side Mounting Assembly. Mounts PD220, PD455, PD1150, or PD1151* Super Stationmaster™ Antennas on square or triangular towers having round legs up to 2-3/8 in. (60 mm) in diameter. Consists of a dual grounded lower support system and an insulated upper support arm. These components are assembled using six (6) PD237 crossover plates and one (1) PD46A clamp set (supplied). PD503 Side Mounting Assembly mounts antennas 6 in. (152 mm) to 7 ft. (2.1 m) away from tower having face dimensions ranging between 1 ft. (0.3 m) and 2 ft. (0.6 m). Net wt. 49 lbs. (22.23 kg). Shipping volume 2.16 ft^3 (.061 m^3). See Fig. 2.

PD556 - Side Mounting Assembly. Same as PD503 except mounts PD220, PD455, PD1150 and PD1151 antennas 6 in. (152 mm) to 3ft. (0.91 m) away from tower. Net wt. 29 lbs. (13.15 kg). Shipping volume 1.38 ft.^{3} (0.39 m^3). UPS shippable. See Fig. 2.

*Consult our Customer Service Department with specific mounting application.



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Antenna Mounting Hardware

Side Mounting Assemblies

PD561 - Side Mount Assembly. Mounts PD620 and PD755 Heavy Duty Super Stationmaster™ Antennas on square or triangular towers having round legs up to 2-3/8 in. (60 mm) in diameter. Consists of a dual grounded lower support system and an insulated upper support arm. These components are assembled using six (6) PD237 crossover plates and one (1) PD356A clamp set (supplied). PD561 Side Mounting Assembly mounts antennas 6 in. (152 mm) to 7 ft. (2.1 m) away from tower. Net wt. 50 lbs. (22.68 kg). Shipping volume 2.16 ft^3. (.061 m^3).

PD10024 - Side Mounting Assembly. Designed for mounting PD458, PD1108, PD1109, PD1110 and PD10017 antennas on square or triangular towers having round legs up to 2-3/8 in. (60 mm) in diameter. Consists of a dual grounded lower support system and an insulated adjustable upper support arm. These components are assembled using six (6) PD237 crossover plates and one (1) PD46A clamp set (supplied). The PD10024 Assembly mounts antennas from 6 in. (152 mm) to 3 ft. (0.91 m) away from a tower having face dimensions ranging between 1 ft. (0.3 m) and 2 ft. (0.6 m). Net wt. 30 lbs. (13.6 kg). Shipping volume 1.38 ft.^{3} (.039 m^3).

PD10028 - Side Mounting Assembly. Similar to PD10024 excepts mounts antennas from 6 in. (152 mm) to 7 ft. (2.1 m) away from tower. Net wt. 55 lbs. (24.95 kg.) Shipping volume 2.16 ft.^{3} (0.061 m^3).

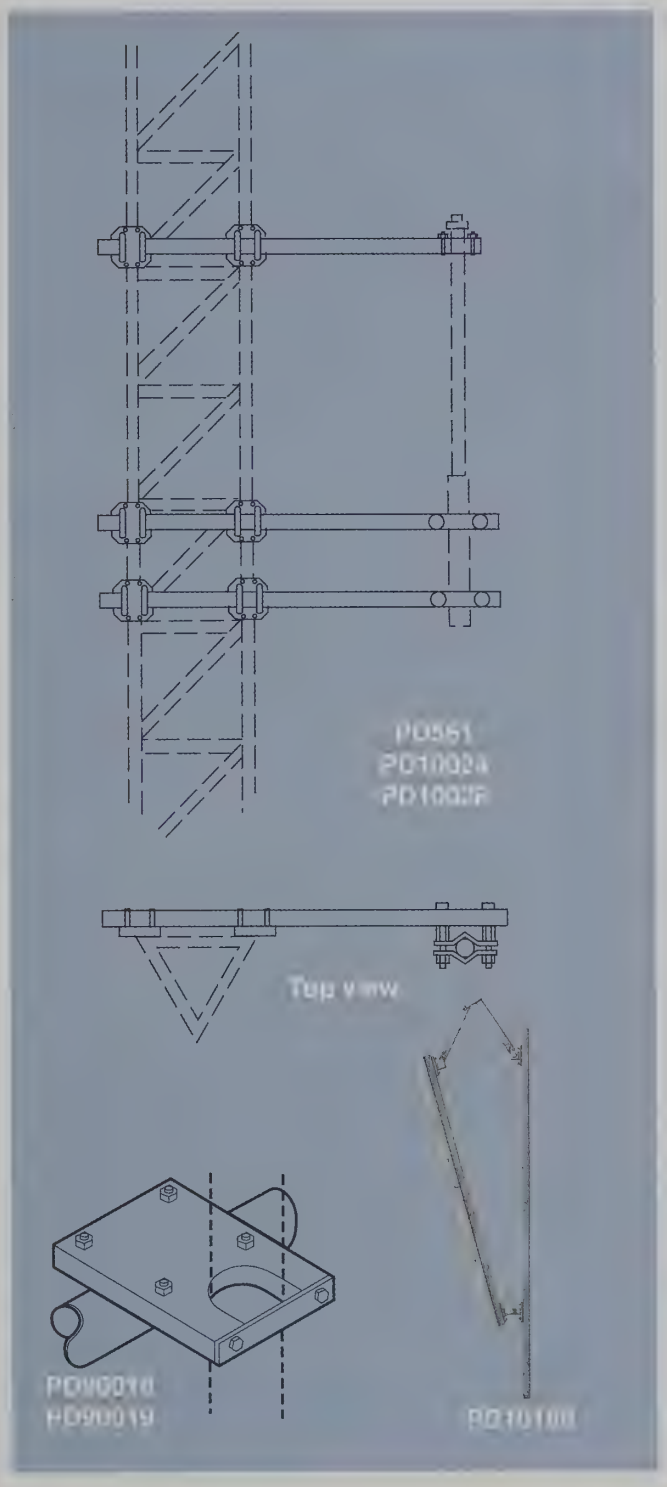
PD90018 - Insulated Adjustable Upper Support. An insulated upper support that clamps directly using a G-10 fiberglass insulator. This type of attachment is necessary when mounting antennas with non-tapering radomes. The PD90018 attaches to square or triangular towers having round legs up to 2-3/8 in. (60 mm) in diameter. Two pieces PD237 crossover plates are supplied for attachment to tower. The PD90018 positions antennas from 6 in. (152 mm) to 3 ft. (0.91 m) away from a tower having face dimensions ranging between 1 ft. (0.3 m) and 2 ft. (0.6 m). Net wt. 12 lbs. (5.44 kg). Shipping volume 1.0 ft.^{3} (.029 m^3). UPS shippable.

PD90019 - Insulated Adjustable Upper Support (Long). Same as PD90018 except supports antennas from 6 in. (152 mm) to 7 ft. (2.1 m) away from tower. Net wt. 20 lbs. (9.07 kg). Shipping volume 1.59 ft.^{3} (.045 m^3).

Tilt Mount Kit

PD10180 - Galvanized steel, scissor-clamp mechanism permits downtilting of antenna to 30 degrees. Mounts on support pipe or tower leg 3 in. (73 mm). Suitable for all panel-style antennas and PD1132. Net wt. 67 lbs. (30 kg). Shipping volume 2.75 ft.^{3} (.082 m^3).

PD10206 - Adapter Plate Kit for Tilt Mount. For tower leg 3-1/2 in. (88.9 mm) to 4-1/2 in. (114.3 mm). Net. wt. 30 lbs. (13.5 kg). Shipping volume .5 ft.^{3} (0.14 m^3).



Side Mounts for Large Tower Legs

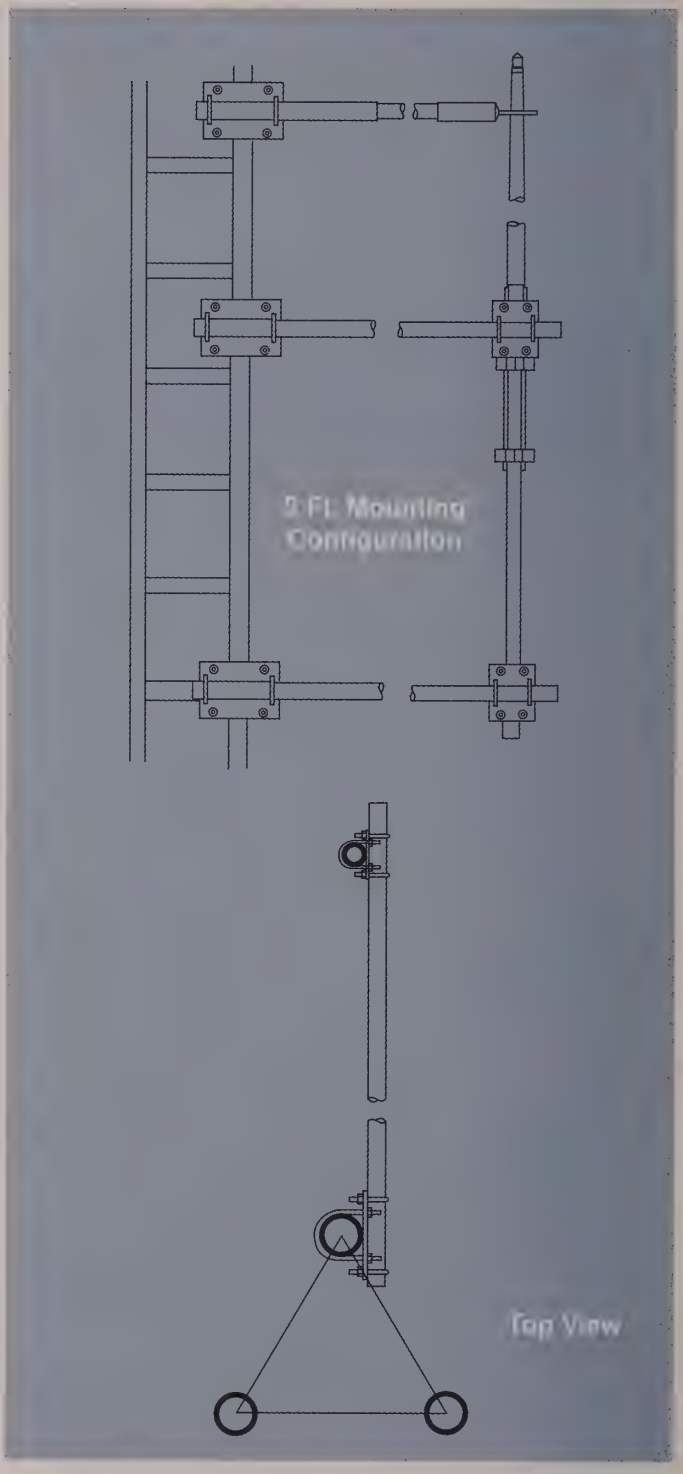
Antenna Side Mounting Hardware is available for towers with legs from 3 inches O.D. to 6 inches O.D. Two side mounting styles are available. One for side mounting an antenna up to 3 feet from the tower, and the other for side mounting the antenna a fixed distance of 6 feet.

Side Mounts for Tower Legs 3.0, 3.5 or 4.0 inches O.D. mounted up to 3 feet away.
The PD10118, PD10120, PD10128, PD10136, PD10140, PD10144, PD10148 and PD10152 Side Mount Assemblies include hardware for side mounting antennas up to 3 feet away from towers with legs 3.0, 3.5 or 4.0 inches O.D. All side mounts consist of an insulated upper support arm and a grounded lower support system.

Side Mounts for Tower Legs 3.0, 3.5 or 4.0 inches O.D. mounted 6 feet away.
The PD1016, PD10121, PD10124, PD10126, PD10138, PD10142, PD10146, PD10150 and PD10154 Side Mount Assemblies include hardware for side mounting antennas a fixed 6 feet from the tower legs 3.0, 3.5, or 4.0 inches O.D. All side mounts consists of an insulated upper support arm and a grounded lower support system. A single tie back is used for extra mechanical stability. The maximum face spread for the tie back assembly is 8.5 feet.

Side Mounts for Tower Legs 4.0 or 6.0 inches O.D. mounted up to 3 feet away.
The PD10119, PD10122, PD10129, PD10137, PD10141, PD10145, PD10149 and PD10153 Side Mount Assemblies include hardware for side mounting antennas up to 3 feet away from towers with legs 5.0 or 6.0 inches O.D. All side mounts consist of an insulated upper support arm and a grounded lower support system.

Side Mounts for Tower Legs 4.0 or 6.0 inches O.D. mounted 6 feet away.
The PD10117, PD10123, PD10125, PD10127, PD10139, PD10143, PD10147, PD10151 and PD10155 Side Mount Assemblies include hardware for side mounting antennas a fixed 6 feet from the tower with legs 5.0 or 6.0 inches O.D. All side mounts consist of an insulated upper support arm and a grounded lower support system. A single tie back is used for extra mechanical stability. The maximum face spread for the tie back assembly is 8.5 feet.



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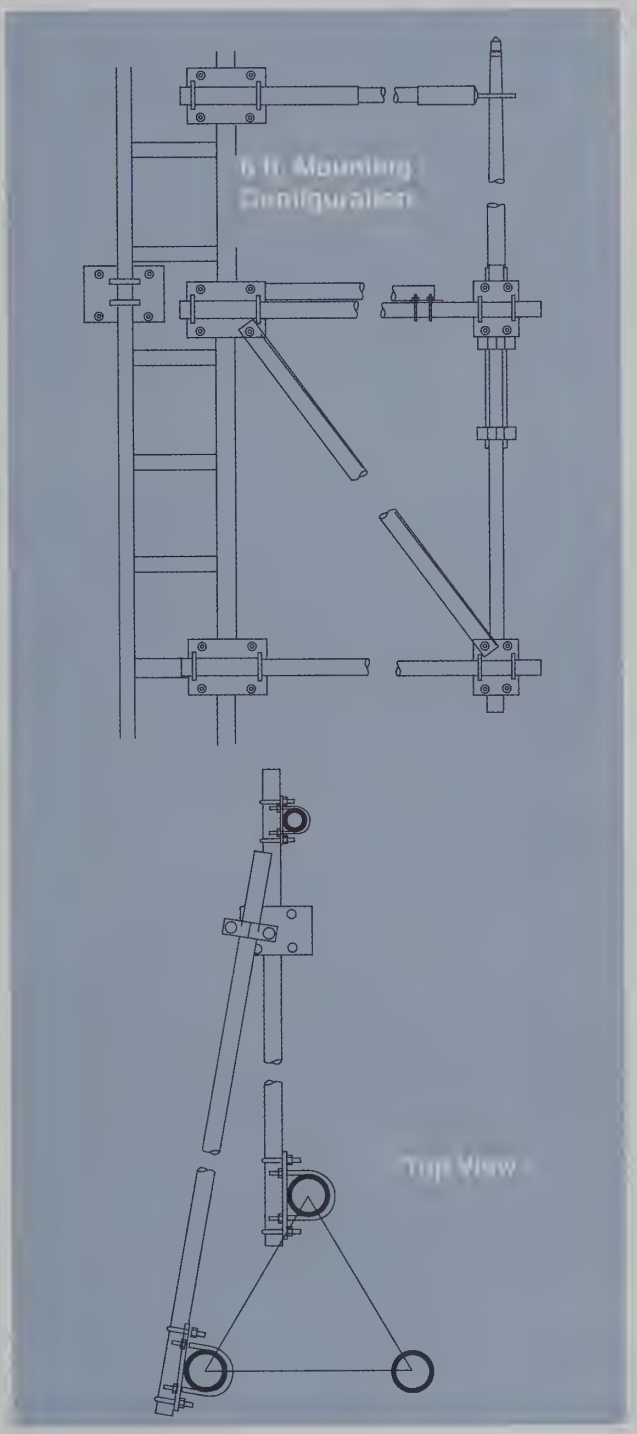
Side Mounts for Large Tower Legs

Side Mount Assemblies: Large Legs

	Tower Legs 3 to 4 inches O.D.		Tower Legs 4 to 6 inches O.D.	
ANTENNA	**3 Ft. Off**	**6 Ft. Off**	**3 Ft. Off**	**6 Ft. Off**
PD79	10140	10142	10141	10143
PD83	10140	10142	10141	10143
PD114	10140	10142	10141	10143
PD128	10140	10142	10141	10143
PD152	10140	10142	10141	10143
PD200	10118	10116	10119	10117
PD201	10128	10126	10129	10127
PD207	10140	10142	10141	10143
PD220	10120	10121	10122	10123
PD340	10140	10142	10141	10143
PD345	10140	10142	10141	10143
PD400	10144	10146	10145	10147
PD440	10140	10142	10141	10143
PD453	10140	10142	10141	10143
PD455	10120	10121	10122	10123
PD458	10136	10138	10137	10139
PD620	—	10124	—	10125
PD755	—	10124	—	10125
PD1107	10140	10142	10141	10143
PD1108	10136	10138	10137	10139
PD1109	10136	10138	10137	10139
PD1110	10136	10138	10137	10139
PD1150	10148	10150	10149	10151
PD1151	10152	10154	10153	10155
PD1610	10140	10142	10141	10143
PD10017	10136	10138	10137	10139
PD10022	10140	10142	10141	10143
PD10036	10128	10126	10129	10127
PD10037	10144	10146	10145	10147



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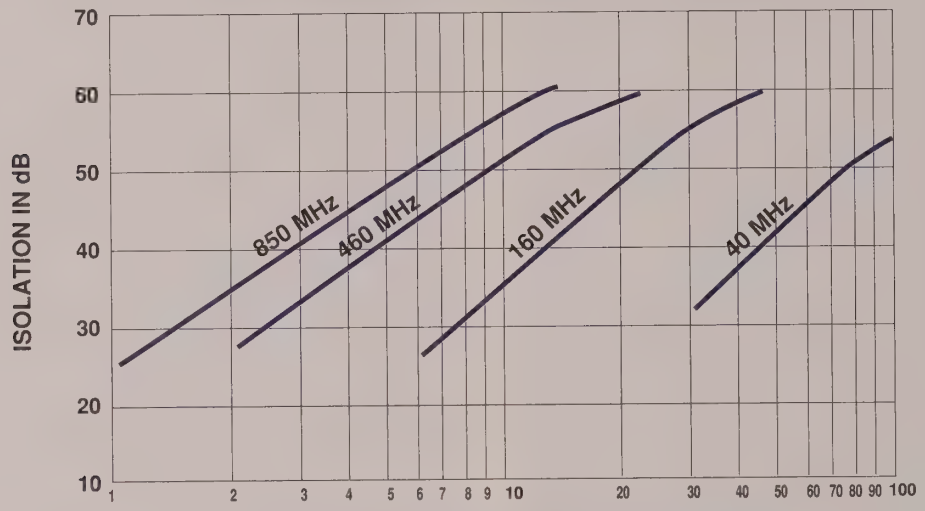
Antenna Isolation Curves

The curves provided below are based on dipoles. Both reflect isolation values that could be expected when two antennas are separated as indicated. In actual installations, the obtainable values may vary somewhat, due to tower coupling or other reflective surfaces near the antenna.

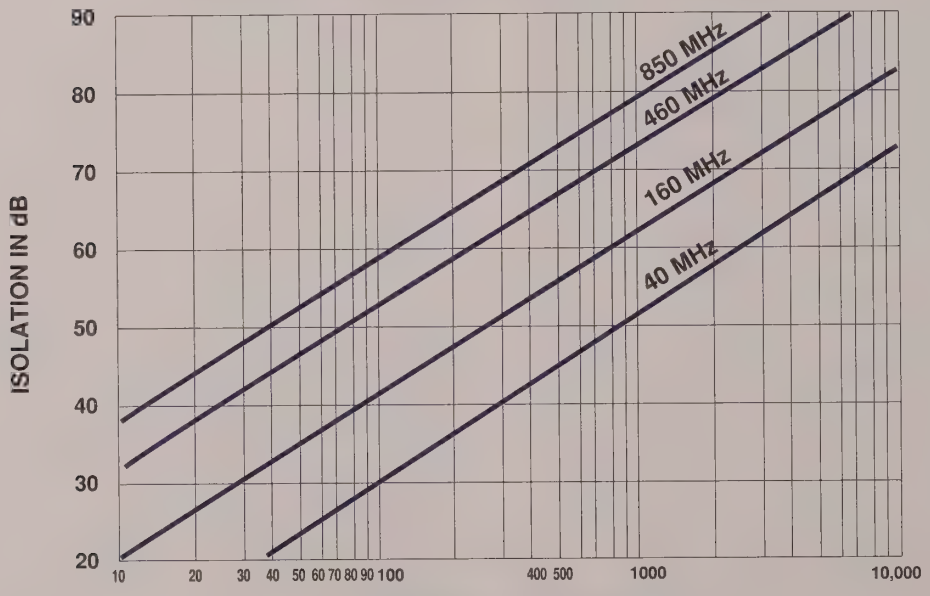
ISOLATION PROVIDED BY VERTICAL SEPARATION



ANTENNA SPACING (TIP TO BOTTOM) IN FEET

The above curves are usable with gain antennas if they are mounted exactly collinearly.

ISOLATION PROVIDED BY HORIZONTAL SEPARATION



ANTENNA SPACING IN FEET

The above curves may also be used to approximate the isolation between gain antennas at less than the following minimum distances. The figures in dB refer to the antenna gains. (150 MHz): 3 dB-18 ft., 6 dB-75 ft., 10 dB-300 ft. (450 MHz): 3 dB-6 ft., 6 dB-25 ft., 10 dB-100 ft. (850 MHz): 3 dB-3 ft., 6 dB-12 ft., 10 dB-50 ft. At greater distances than the preceding, the sum of both antenna gains should be subtracted from the value found in the chart.

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Power Divider Harnesses

For Multiple Antenna Arrays

In most cases standard antennas listed in this catalog will cover the required service areas of two-way radio systems. However, a combination of two or more antennas may be required to achieve higher gains or special pattern shapes.

For example, where more gain is required than can be produced by a single corner reflector antenna, two, four, or more of these antennas may be stacked and fed in phase. Since the number of antennas is doubled, the gain of the array is increased by approximately 3 dBd minus the cable losses.

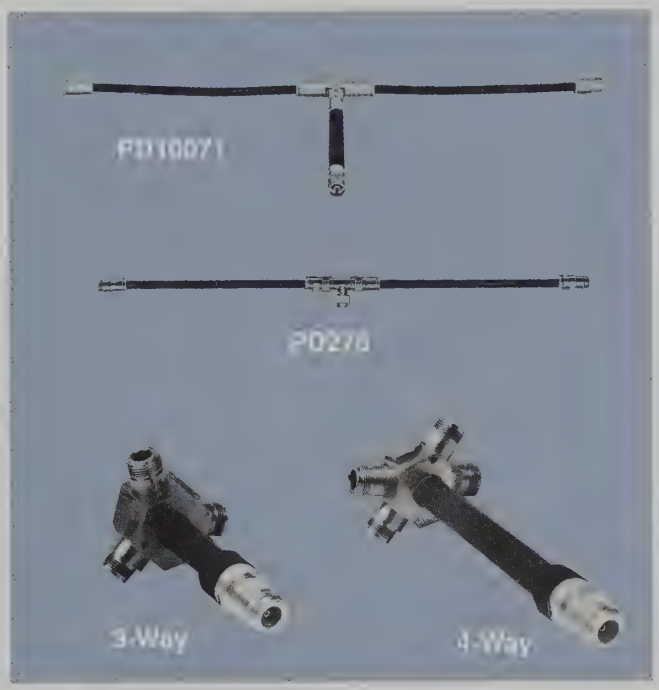
When ordering power divider harnesses, the exact frequency of operation must be specified as well as the Celwave catalog number of the antennas to be stacked.

To maximize the antenna array's performance, the antennas and harnesses should be purchased on the same order if possible so that the system may be checked in our production laboratory before shipment.

Additional jumpers of RG214, RG393 or LLF cable with mating connectors are available.

Please contact our Customer Service Department for assistance in determining your optimum harness arrangement. We require the following information:

1. Model number of antennas in array.
2. Distance antennas will be separated when mounted.
3. Exact frequency of operation.
4. Tower dimensions including face and tower leg dimensions.



2 Way Power Dividers

25-400 MHz **PD278, PD279**

The PD278 Power Divider Harness is designed to divide a single cable to feed two antennas operating within the 25-400 MHz frequency range. Each "leg" of the PD278 is made of RG11A/U type cable measuring only 12 inches (305 mm) long (@ 150 and 400 MHz). Additional jumper cabling may be necessary to reach each antenna. The length of each jumper must be precisely calculated to properly phase and match each antenna. The two output terminations are N-female, the single input connector is N-male.

The PD279 Power Divider Harness is comprised of three PD278 power dividers. Four antennas may be fed using this divider.

806-1000 MHz **PD10072, PD10071**

The PD10072 Power Divider Harness has a transformer section to properly match antennas operating over the 800-1000 MHz frequency range. The PD10071 features RG214B/U double shielded cable with N-male output terminations and a N-male input termination. Each cable "leg" of the harness measures 12 inches (305 mm). This harness may be purchased with longer cable "legs". Specify PD10071SP along with the appropriate amount of cable needed.

Ordering Information
2, 3 and 4 Way Dividers

Item No.	Ports	Freq. Range	Size	Loss
PD10079	2-Way	406-512	7.5" x 0.5 dia.	3.2 dB
PD10072	2-Way	800-960	5.0" x 0.5 dia.	3.2 dB
PD10075	3-Way	406-512	6.5" x 0.5 dia.	4.9 dB
PD10076	3-Way	800-960	4.0" x 0.5 dia.	4.9 dB
PD10077	4-Way	406-512	6.5" x 0.5 dia.	6.4 dB
PD10078	4-Way	800-960	4.0" x 0.5 dia.	6.4 dB

Note: Above dividers all ports N-female. LC male input connector for high power optional.

Given: Decibels
To Find: Power and Voltage Current Ratios

To Account for the Sign of the Decibel
For positive (+) values of the decibel – Both voltage and power ratios are greater than unity. Use the two right hand columns.

For negative (-) values of the decibel – Both voltage and power ratios are less than the unity. Use the two left hand columns.

Example –
Given: ≠ 9.1 dB Find:

dB	POWER RATIO	VOLTAGE RATIO
+ 9.1	8.128	2.851
- 9.1	0.1230	0.3508

TABLE 1

VOLTAGE RATIO	POWER RATIO	◖ - dB + ◗ dB	VOLTAGE RATIO	POWER RATIO
1.0000	1.0000	0.0	1.000	1.000
.9886	.9772	0.1	1.012	1.023
.9772	.9550	0.2	1.023	1.047
.9661	.9333	0.3	1.035	1.072
.9550	.9120	0.4	1.047	1.096
.9441	.8913	0.5	1.059	1.122
.9333	.8710	0.6	1.072	1.148
.9226	.8511	0.7	1.084	1.175
.9120	.8318	0.8	1.096	1.202
.9016	.8128	0.9	1.109	1.230
.8913	**.7943**	**1.0**	**1.122**	**1.259**
.8810	.7762	1.1	1.135	1.288
.8710	.7586	1.2	1.148	1.318
.8610	.7413	1.3	1.161	1.349
.8511	.7244	1.4	1.175	1.380
.8414	.7079	1.5	1.189	1.413
.8318	.6918	1.6	1.202	1.445
.8222	.6761	1.7	1.216	1.479
.8128	.6607	1.8	1.230	1.514
.8035	.6457	1.9	1.245	1.549
.7943	**.6310**	**2.0**	**1.259**	**1.585**
.7852	.6166	2.1	1.274	1.622
.7762	.6026	2.2	1.288	1.660
.7674	.5888	2.3	1.303	1.698
.7586	.5754	2.4	1.318	1.738
.7499	.5623	2.5	1.334	1.778
.7413	.5495	2.6	1.349	1.820
.7328	.5370	2.7	1.365	1.862
.7244	.5248	2.8	1.380	1.905
.7161	.5129	2.9	1.396	1.950
.7079	**.5012**	**3.0**	**1.413**	**1.995**
.6998	.4898	3.1	1.429	2.042
.6918	.4786	3.2	1.445	2.089
.6839	.4677	3.3	1.462	2.138
.6761	.4571	3.4	1.479	2.188
.6683	.4467	3.5	1.496	2.239
.6607	.4365	3.6	1.514	2.291
.6531	.4266	3.7	1.531	2.344
.6457	.4169	3.8	1.549	2.399
.6383	.4074	3.9	1.567	2.455
.6310	**.3981**	**4.0**	**1.585**	**2.512**
.6237	.3890	4.1	1.603	2.570
.6166	.3802	4.2	1.622	2.630
.6095	.3715	4.3	1.641	2.692
.6026	.3631	4.4	1.660	2.754
.5957	.3548	4.5	1.679	2.818
.5888	.3467	4.6	1.698	2.884
.5821	.3388	4.7	1.718	2.951
.5754	.3311	4.8	1.738	3.020
.5689	.3236	4.9	1.758	3.090
.5623	**.3162**	**5.0**	**1.778**	**3.162**
.5559	.3090	5.1	1.799	3.236
.5495	.3020	5.2	1.820	3.311
.5433	.2951	5.3	1.841	3.388
.5370	.2884	5.4	1.862	3.467
.5309	.2818	5.5	1.884	3.548
.5248	.2754	5.6	1.905	3.631
.5188	.2692	5.7	1.928	3.715
.5129	.2630	5.8	1.950	3.802
.5070	.2570	5.9	1.972	3.890
.5012	**.2512**	**6.0**	**1.995**	**3.981**
.4955	.2455	6.1	2.018	4.074
.4898	.2399	6.2	2.042	4.169
.4842	.2344	6.3	2.065	4.266
.4786	.2291	6.4	2.089	4.365
.4732	.2239	6.5	2.113	4.467
.4677	.2188	6.6	2.138	4.571
.4624	.2138	6.7	2.163	4.677
.4571	.2089	6.8	2.188	4.786
.4519	.2042	6.9	2.213	4.898
.4467	**.1995**	**7.0**	**2.239**	**5.012**
.4416	.1950	7.1	2.265	5.129
.4365	.1905	7.2	2.291	5.248
.4315	.1862	7.3	2.317	5.370
.4266	.1820	7.4	2.344	5.495
.4217	.1778	7.5	2.371	5.623
.4169	.1738	7.6	2.399	5.754
.4121	.1698	7.7	2.427	5.888
.4074	.1660	7.8	2.455	6.026
.4027	.1622	7.9	2.483	6.166
.3981	**.1585**	**8.0**	**2.512**	**6.310**
.3936	.1549	8.1	2.541	6.457
.3890	.1514	8.2	2.570	6.607
.3846	.1479	8.3	2.600	6.761
.3802	.1445	8.4	2.630	6.918
.3758	.1413	8.5	2.661	7.079
.3715	.1380	8.6	2.692	7.244
.3673	.1349	8.7	2.723	7.413
.3631	.1318	8.8	2.754	7.586
.3589	.1288	8.9	2.786	7.762
.3548	**.1259**	**9.0**	**2.818**	**7.943**
.3508	.1230	9.1	2.851	8.128
.3467	.1202	9.2	2.884	8.318
.3428	.1175	9.3	2.917	8.511
.3388	.1148	9.4	2.951	8.710
.3350	.1122	9.5	2.985	8.913
.3311	.1096	9.6	3.020	9.120
.3273	.1072	9.7	3.055	9.333
.3236	.1047	9.8	3.090	9.550
.3199	.1023	9.9	3.126	9.772

TABLE 1 (Continued)

VOLTAGE RATIO	POWER RATIO	◀ - dB + ▶ dB	VOLTAGE RATIO	POWER RATIO
.3162	**.1000**	**10.0**	**3.162**	**10.000**
.3126	.09772	10.1	3.199	10.23
.3090	.09550	10.2	3.236	10.47
.3055	.09333	10.3	3.273	10.72
.3020	.09120	10.4	3.311	10.96
.2985	.08913	10.5	3.350	11.22
.2951	.08710	10.6	3.388	11.48
.2917	.08511	10.7	3.428	11.75
.2884	.08318	10.8	3.467	12.02
.2851	.08128	10.9	3.508	12.30
.2818	**.07943**	**11.0**	**3.548**	**12.59**
.2786	.07762	11.1	3.589	12.88
.2754	.07586	11.2	3.631	13.18
.2723	.07413	11.3	3.673	13.49
.2692	.07244	11.4	3.715	13.80
.2661	.07079	11.5	3.758	14.13
.2630	.06918	11.6	3.802	14.45
.2600	.06761	11.7	3.846	14.79
.2570	.06607	11.8	3.890	15.14
.2541	.06457	11.9	3.936	15.49
.2512	**.06310**	**12.0**	**3.981**	**15.85**
.2483	.06166	12.1	4.027	16.22
.2455	.06026	12.2	4.074	16.60
.2427	.05888	12.3	4.121	16.98
.2399	.05754	12.4	4.169	17.38
.2371	.05623	12.5	4.217	17.78
.2344	.05495	12.6	4.266	18.20
.2317	.05370	12.7	4.315	18.62
.2291	.05248	12.8	4.365	19.05
.2265	.05129	12.9	4.416	19.50
.2239	**.05012**	**13.0**	**4.467**	**19.95**
.2213	.04898	13.1	4.519	20.42
.2188	.04786	13.2	4.571	20.89
.2163	.04677	13.3	4.624	21.38
.2138	.04571	13.4	4.677	21.88
.2113	.04467	13.5	4.732	22.39
.2089	.04365	13.6	4.786	22.91
.2065	.04266	13.7	4.842	23.44
.2042	.04169	13.8	4.898	23.99
.2018	.04074	13.9	4.955	24.55
.1995	**.03981**	**14.0**	**5.012**	**25.12**
.1972	.03890	14.1	5.070	25.70
.1950	.03802	14.2	5.129	26.30
.1928	.03715	14.3	5.188	26.92
.1905	.03631	14.4	5.248	27.54
.1884	.03548	14.5	5.309	28.18
.1862	.03467	14.6	5.370	28.84
.1841	.03388	14.7	5.433	29.51
.1820	.03311	14.8	5.495	30.20
.1799	.03236	14.9	5.559	30.90
.1778	**.03162**	**15.0**	**5.623**	**31.62**
.1758	.03090	15.1	5.689	32.36
.1738	.03020	15.2	5.754	33.11
.1718	.02951	15.3	5.821	33.88
.1698	.02884	15.4	5.888	34.67
.1679	.02818	15.5	5.957	35.48
.1660	.02754	15.6	6.026	36.31
.1641	.02692	15.7	6.095	37.15
.1622	.02630	15.8	6.166	38.02
.1603	.02570	15.9	6.237	38.90

VOLTAGE RATIO	POWER RATIO	◀ - dB + ▶ dB	VOLTAGE RATIO	POWER RATIO
.1585	**.02512**	**16.0**	**6.310**	**39.81**
.1567	.02455	16.1	6.383	40.74
.1549	.02399	16.2	6.457	41.69
.1531	.02344	16.3	6.531	42.66
.1514	.02291	16.4	6.607	43.65
.1496	.02239	16.5	6.683	44.67
.1479	.02188	16.6	6.761	45.71
.1462	.02138	16.7	6.839	46.77
.1445	.02089	16.8	6.918	47.86
.1429	.02042	16.9	6.998	48.98
.1413	**.01995**	**17.0**	**7.079**	**50.12**
.1396	.01950	17.1	7.161	51.29
.1380	.01905	17.2	7.244	52.48
.1365	.01862	17.3	7.328	53.70
.1349	.01820	17.4	7.413	54.95
.1334	.01778	17.5	7.499	56.23
.1318	.01738	17.6	7.586	57.54
.1303	.01698	17.7	7.674	58.88
.1288	.01660	17.8	7.762	60.26
.1274	.01622	17.9	7.852	61.66
.1259	**.01585**	**18.0**	**7.943**	**63.10**
.1245	.01549	18.1	8.035	64.57
.1230	.01514	18.2	8.128	66.07
.1216	.01479	18.3	8.222	67.61
.1202	.01445	18.4	8.318	69.18
.1189	.01413	18.5	8.414	70.79
.1175	.01380	18.6	8.511	72.44
.1161	.01349	18.7	8.610	74.13
.1148	.01318	18.8	8.710	75.86
.1135	.01288	18.9	8.811	77.62
.1122	**.01259**	**19.0**	**8.913**	**79.43**
.1109	.01230	19.1	9.016	81.28
.1096	.01202	19.2	9.120	83.18
.1084	.01175	19.3	9.226	85.11
.1072	.01148	19.4	9.333	87.10
.1059	.01122	19.5	9.441	89.13
.1047	.01096	19.6	9.550	91.20
.1035	.01072	19.7	9.661	93.33
.1023	.01047	19.8	9.772	95.50
.1012	.01023	19.9	9.886	97.72
.1000	**.01000**	**20.0**	**10.000**	**100.00**

VOLTAGE RATIO	POWER RATIO	◀ - dB + ▶ dB	VOLTAGE RATIO	POWER RATIO
3.162×10^{-1}	**10^{-1}**	**10**	**3.162**	**10**
10^{-1}	10^{-2}	20	10	10^{2}
3.162×10^{-2}	10^{-3}	30	3.162×10	10^{3}
10^{-2}	10^{-4}	40	10^{2}	10^{4}
3.162×10^{-3}	10^{-5}	50	3.162×10^{2}	10^{5}
10^{-3}	10^{-6}	60	10^{3}	10^{6}
3.162×10^{-4}	10^{-7}	70	3.162×10^{3}	10^{7}
10^{-4}	10^{-8}	80	10^{4}	10^{8}
3.162×10^{-5}	10^{-9}	90	3.162×10^{4}	10^{9}
10^{-5}	**10^{-10}**	**100**	**10^{5}**	**10^{10}**

DECIBELS (dB) AND POWER, VOLTAGE, AND CURRENT RATIOS

Power Ratio	Voltage and& Current Ratio	Decibels
1.0233	1.0116	0.1
1.0471	1.0233	0.2
1.0715	1.0351	0.3
1.0965	1.0471	0.4
1.1220	1.0593	0.5
1.1482	1.0715	0.6
1.1749	1.0839	0.7
1.2023	1.0956	0.8
1.2303	1.1092	0.9
1.2589	1.1220	1.0
1.3183	1.1482	1.2
1.3804	1.1749	1.4
1.4454	1.2023	1.6
1.5136	1.2303	1.8
1.5849	1.2589	2.0
1.6595	1.2882	2.2
1.7378	1.3183	2.4
1.8197	1.3490	2.6
1.9055	1.3804	2.8
1.9953	1.4125	3.0
2.2387	1.4962	3.5
2.5119	1.5849	4.0
2.8184	1.6788	4.5
3.1623	1.7783	5.0
3.5481	1.8836	5.5
3.9811	1.9953	6.0
5.0119	2.2387	7.0
6.3096	2.5119	8.0
7.9433	2.8184	9.0
10.000	3.1623	10.0
12.589	3.5481	11.0
15.849	3.9811	12.0
19.953	4.4668	13.0
26.119	5.0119	14.0
31.623	5.6234	15.0
39.811	6.3096	16.0
50.119	7.0795	17.0
63.096	7.9433	18.0
79.433	8.9125	19.0
100.00	10.0000	20.0
158.49	12.589	22.0
251.19	15.849	24.0
398.11	19.953	26.0
630.96	25.119	28.0
1000.0	31.623	30.0
1584.9	39.811	32.0
2511.9	50.119	34.0
3981.1	63.096	36.0
6309.6	79.433	38.0
10^4	100.000	40.0
10^4 x 1.5849	125.89	42.0
10^4 x 2.5119	158.49	44.0
10^4 x 3.9811	199.53	46.0
10^4 x 6.3096	251.19	48.0
10^5	316.23	50.0
10^5 x 1.5849	398.11	52.0
10^5 x 2.5119	501.19	54.0
10^5 x 3.9811	630.96	56.0
10^5 x 6.3096	794.33	58.0
10^6	1,000	60.0
10^7	3,162.3	70.0
10^8	10,000.0	80.0
10^9	31,623	90.0
10^{10}	100,000	100.0

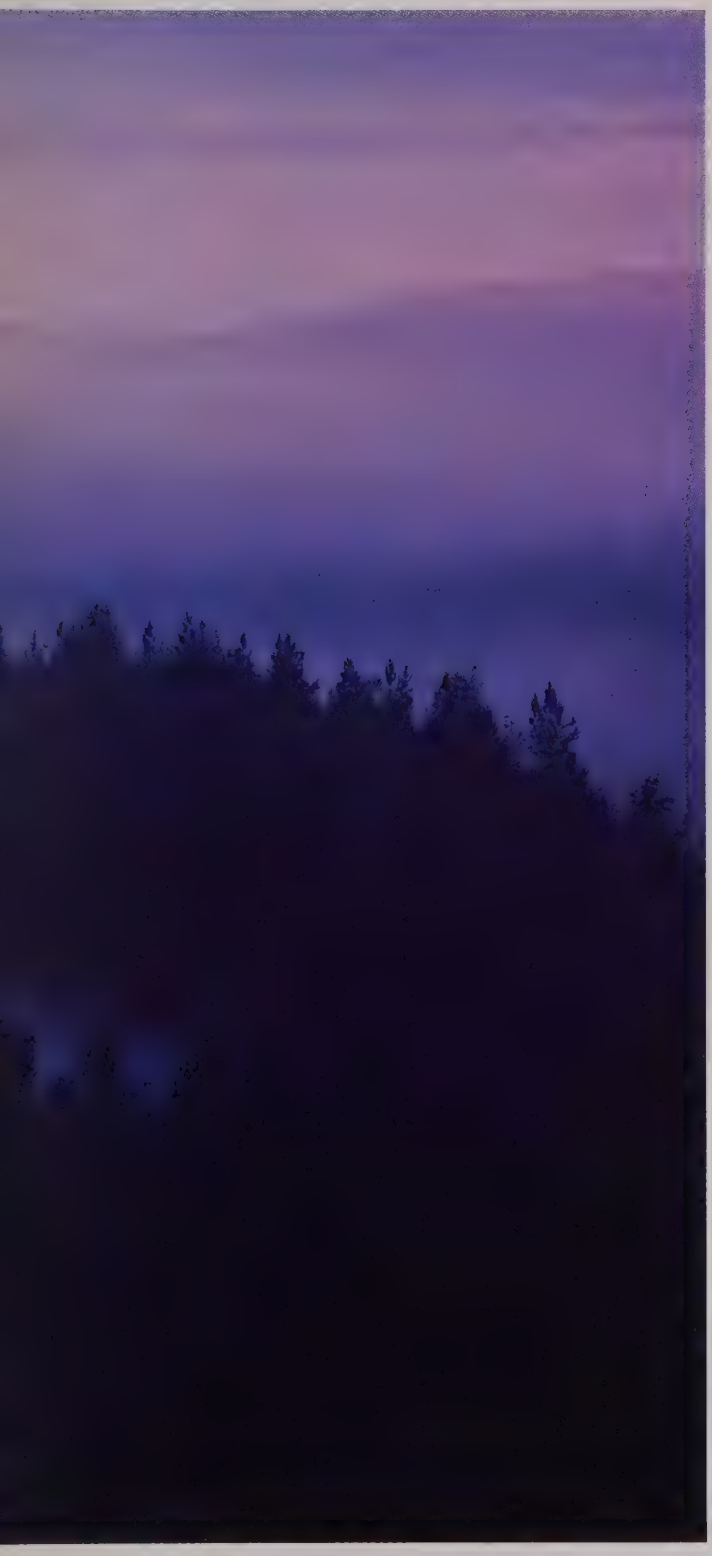
To convert:
Decibels to nepers multiply by 0.1151.
Nepers to decibels multiply by 8.686.
Where the power ratio is less than unity, it is usual to invert the fraction and express the answer as a decibel loss.

Technical Information

RETURN LOSS vs VSWR

RETURN LOSS dB	VSWR	RETURN LOSS dB	VSWR	RETURN LOSS dB	VSWR
0.0	∞	21.0	1.196	42.0	1.0160
0.5	34.7	21.5	1.184	42.5	1.0151
1.0	17.3	22.0	1.172	43.0	1.0143
1.5	11.6	22.5	1.162	43.5	1.0134
2.0	8.71	23.0	1.162	44.0	1.0127
2.5	7.00	23.5	1.143	44.5	1.0120
3.0	5.85	24.0	1.135	45.0	1.0113
3.5	5.02	24.5	1.127	45.5	1.0107
4.0	4.42	25.0	1.119	46.0	1.0101
4.5	3.95	25.5	1.112	46.5	1.0095
5.0	3.57	26.0	1.105	47.0	1.0090
5.5	3.26	26.5	1.099	47.5	1.0085
6.0	3.01	27.0	1.094	48.0	1.0080
6.5	2.80	27.5	1.088	48.5	1.0075
7.0	2.62	28.0	1.083	49.0	1.0071
7.5	2.46	28.5	1.078	49.5	1.0067
8.0	2.32	29.0	1.074	50.0	1.0063
8.5	2.21	29.5	1.069	50.5	1.0060
9.0	2.10	30.0	1.065	51.0	1.0057
9.5	2.01	30.5	1.062	51.5	1.0053
10.0	1.92	31.0	1.058	52.0	1.0050
10.5	1.85	31.5	1.055	52.5	1.0048
11.0	1.79	32.0	1.051	53.0	1.0045
11.5	1.72	32.5	1.049	53.5	1.0042
12.0	1.67	33.0	1.046	54.0	1.0040
12.5	1.62	33.5	1.043	54.5	1.0038
13.0	1.68	34.0	1.041	55.0	1.0035
13.5	1.53	34.5	1.038	55.5	1.0034
14.0	1.50	35.0	1.036	56.0	1.0032
14.5	1.46	35.5	1.034	56.5	1.0030
15.0	1.43	36.0	1.032	57.0	1.0028
15.5	1.40	36.5	1.030	57.5	1.0027
16.0	1.38	37.0	1.029	58.0	1.0025
16.5	1.35	37.5	1.027	58.5	1.0024
17.0	1.33	38.0	1.026	59.0	1.0022
17.5	1.31	38.5	1.024	59.5	1.0021
18.0	1.29	39.0	1.023	60.0	1.0020
18.5	1.27	39.5	1.021	60.5	1.00189
19.0	1.25	40.0	1.020	61.0	1.00178
19.5	1.233	40.5	1.0191	61.5	1.00168
20.0	1.222	41.0	1.0180	62.0	1.00159
20.5	1.208	41.5	1.0170	62.5	1.00150

"Car 351, where are you?"



Ten years ago, there wasn't a police department, fire department, EMS or county service that wasn't having trouble with "black holes" in Bucks County, Pennsylvania.

There was no 800 MHz in service back then, and no money to put it in place even if there had been. Existing equipment ranged from old, 155 MHz vacuum tube rigs to gear operating anywhere from 46 to 455 MHz. Elevations ranged from sea level to 1000 feet and only seven antenna sites were available for tying everything together and wiping out the dead spots.

Given all those complications and more, a Celwave engineering team designed a system, placed the resulting arrays of antennas on the seven towers and fine tuned them.

Since then, the black holes of Bucks County have dissappeared. There have been no site failures, no negative environmental impact and a system stressed to the maximum by its multiple users has yet to come undone.

Celwave has designed and equipped antenna systems to meet all kinds of needs all over the world. Sometime soon, we could do the same for you.

CELWAVE

DIVISION OF RADIO FREQUENCY SYSTEMS

Let's talk about your future.

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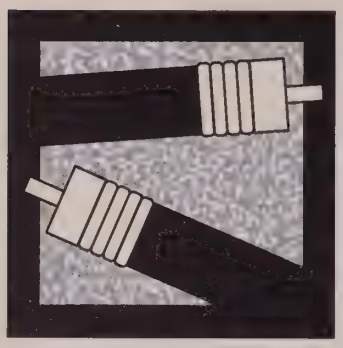
Introduction to Cables, Connectors, Hardware and Accessories

Preparing Cable for Installation

Celwave coaxial cables are shipped coiled in cartons, or non-returnable type wooden reels.



Although cable on reels is protected by wooden lagging or a fiberboard wrap, it should be handled carefully. Reels should stand upright and never be dropped during handling. If fork lifts are used, the forks must be long enough to engage both reel flanges or cable damage can result. When cable is ordered with factory installed connectors, the antenna end is wound on the outside of the coil and hoisted by means of the cable grip which can be factory installed if specified on the order.

After carefully unlagging the reel, inspect the cable for any signs of shipping damage. Both smooth wall aluminum and copper corrugated cables can be installed without special tools or equipment. Hoisting grips are employed to support the cable during lifting. Straptite, cable ties, or cable hangers are used to affix the cable securely to the tower while angle and round member adaptors eliminate any need to drill holes.

Tower Installation

Few tower installations are identical and only typical planning considerations are outlined here. A pulley and line are recommended for safe lifting of coaxial cables. The hoisting line should be long enough to allow tieing to the cable along the vertical run about every 50 feet (15 m). Cable grips are used to support the cable every 200 feet (60 m) and may be fastened to the tower as permanent hangers.

For short lengths, uncoil the cable along the ground, away from the base of the tower, and attach the hoist line. For longer lengths of cable, position the reel at the base of the tower with the reel supported on an axle to allow smooth and controlled unreeling. Attach the hoisting grip and line. Place a protected wrap over the connector to prevent damage during hoisting and slowly hoist the cable.

Form a drip loop in the cable after connector installation and before it enters the antenna to see that it prevents water from being collected on any cable surface. Check to be sure that should ice fall from the structure above that it will not sever the cable. (An ice shield is recommended). It is further suggested that a yearly maintenance program be instigated on all taped and protected connectors exposed to the outer elements. Should any show signs of weathering, they should be recoated or replaced in order to have a trouble-free communication system.

After the cable is raised, the cable grip is permanently secured to the tower and the connector attached to the antenna. For standard installations, Straptite ties or cable hangers may be spaced according to the following chart:

Rated Max. Wind Speed MPH (km/hr)	Cable Dia. Radial Ice in. (mm)	Cable Diameter 1-5/8" ft. (m)	7/8" ft. (m)	1/2" ft. (m)
90 (145)		6 (1.8)	4 (120)	3 (90)
110 (180)	no	5 (1.5)	4 (120)	3 (90)
130 (210)	ice	5 (1.5)	3 (90)	3 (60)
180 (290)		4 (1.2)	3 (90)	2 (60)
90 (145)	1/2 (12)	6 (1.8)	4 (120)	3 (90)
110 (180)		5 (1.5)	3 (90)	2 (60)
130 (210)		4 (1.2)	3 (90)	2 (60)
90 (145)	1 (25)	4 (1.2)	3 (90)	2-1/2 (75)
110 (180)		4 (1.2)	3 (90)	2 (60)
130 (210)		3 (0.9)	2 (60)	1-1/2 (45)
90 (145)	2 (50)	4 (1.2)	3 (90)	2 (60)
110 (180)		3 (0.9)	2-1/2 (75)	1-1/2 (45)
130 (210)		3 (0.9)	2 (60)	1-1/2 (60)

Celwave closed cell, low loss foam cable is impervious to moisture unless the cell walls have been ruptured. Nevertheless, cable ends should be capped when stored outdoors. If they are not, we recommend cutting at least 5" off each end in case water has migrated between the center conductor and the core. If the center conductor is hollow, make sure that it's drained before the bottom connector is installed to avoid water being trapped inside the connector.

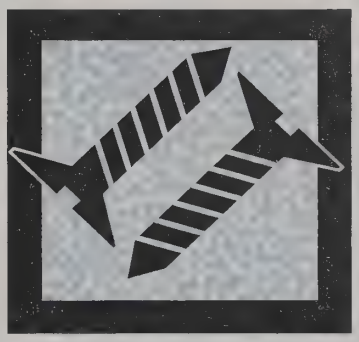
Celwave can fabricate your cable system in the quality controlled environment of our plants or provide the cables and connectors to you for field assembly. A little extra care when installing connectors to ensure adequate moisture protection can save many hours and thousands of dollars later. We suggest the following procedure:

First, the cable jacket and connectors should be cleaned with a degreaser to remove all oils from handling. Next, apply a coating of an adhesive covering six inches or so, along the cable jackets and on all of the connector's surface. It is sometimes necessary to let this first layer of adhesive air-dry before putting tape over it. If there are any large irregular surfaces or corners, it is suggested that a filler be used since a smooth surface can be more easily sealed to the elements. Should a filler be used, a layer of adhesive should be put on before and after the filler.

Alternate layers of adhesive and black polyethylene tape form the final seal. Polyethylene tape is recommended because it, like other cable jackets, has proven an extremely long outdoor life whereas the vinyl tapes show signs of weathering quite rapidly under bright sun light conditions.

Coaxial cable should be attached to a good electrical ground with grounding kits at the top of the vertical run near the antenna, at the bottom of the tower, and at the building entrance. The moisture proofing procedure outlined above should be used where the jacket of the cable is cut back so that the metallic cable shield can be bonded to the tower. PD395 or PD593 in-line lightning arrestors can also be installed to minimize risk to costly radio equipment.

All environmentally exposed hardware should be selected for its durability and corrosion resistance.



The heavy-duty hardware shown in this catalog has been designed for ease of installation and long life. Most Celwave mounting clamps are mechanically zinc galvanized to provide superior corrosion resistance and no clogged thread problems.

LLFLEX™ Foam Coaxial Cable and Connectors

1/2"

1/2" Highly Flexible LLFLEX™
HCF 12-50JCu2Y 810907-008

The stranded inner conductor, very deep corrugated outer conductor and polyethylene jacket of this cable give it easy handling and routing characteristics. Its excellent flexibility enables it to withstand repeated bending in tight areas. LLFLEX12 is highly suitable for applications where RF screening efficiency, imperviousness to vapor and mechanical strength are required. Weather-proof connectors have been designed for easy assembly in the field using only common hand tools.

- **Low loss** — Maximizes system performance.
- **Small bending radius** — Able to withstand repeated bending.
- **Vapor proof** — Assure system reliability.

CONNECTOR DIMENSIONS AND WEIGHT

	Ordering No. 734701	734710
Type	N-male	N-female
Cable Size	1/2"	1/2"
Ohms	50	50
O.D. - in. (mm)	.87 (22.1)	.87 (22.1)
Length - in. (mm)	2.2 (55.9)	2.2 (55.9)
Weight - lbs. (kg)	.276 (.125)	.276 (.125)

To order specify:
1. Cable Type and Ordering Number.
2. Length in feet or meters.
3. Connector Type and Ordering Number; "Attached" (PD1258) or "Unattached".
4. Shipping Instructions.
5. Special Requirements.

Cable Type	Description	Ordering No.
HCF 12-50JCu2Y	1/2" LLFLEX	**810907-008**

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

LLFLEX™ Foam Coaxial Cable and Connectors

ELECTRICAL SPECIFICATIONS

Cable Type (Ordering No.)	Cable Size	Impedance Ohms	Velocity of Propagation Percent	Max. Freq. 90% fco GHz	Attenuation dB/100 ft. (db/100m) 30 MHz	400MHz	1000MHz	Average Power, kW @ 40°C Ambient 30 MHz	400 MHz	1000 MHz
HCF 12-50J Cu2Y (810907-008)	1/2"	50	79	8.5	0.59 (1.94)	2.3 (7.6)	3.9 (12.7)	3.3	0.87	0.52

MECHANICAL SPECIFICATIONS

Cable Type (Ordering No.)	Center Conductor O.D., in. (mm)	Outer Conductor O.D., in. (mm)	Jacket O.D., (mm)	Minimum Bending Radius, in. (mm)	Cable Weight lbs/ft (kg/m)
HCF 12-50J Cu2Y (810907-008)	0.145 (3.7)	0.48 (12.3)	0.53 (13.5)	1.2 (30)	0.16 (.24)

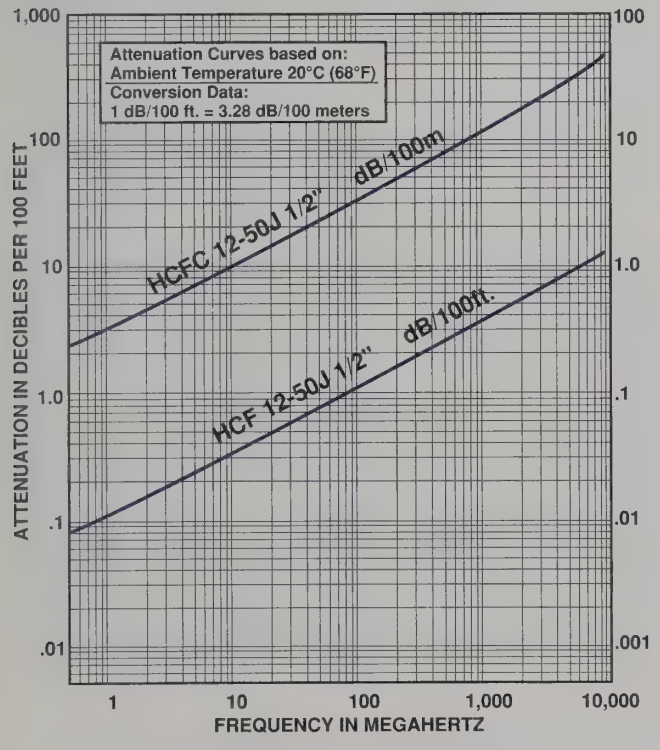
SHIPPING INFORMATION

Cable Type and Length ft. (m) 1/2"	Package	Shipping Size inches (mm)	Shipping Volume Cu. ft. (Cu. m)	Tare Weight lbs. (kg)
0-500 (0-152)	Carton	30 x 30 x 5 (762 x 762 x 127)	2.6 (.073)	5 (2.26)
0-500 (0-152)	Non-returnable reel	33 dia. x 20 wide (833 x 508)	12.6 (0.35)	106 (48.1)
500-1050 (152-320)	Non-returnable reel	43 dia. x 23 wide (1092 x 584)	24.6 (0.69)	211 (95.7)
1050-5000 (320-1524)	Non-returnable reel	51 dia. x 36 wide (1296 x 914)	54.2 (1.53)	342 (155)

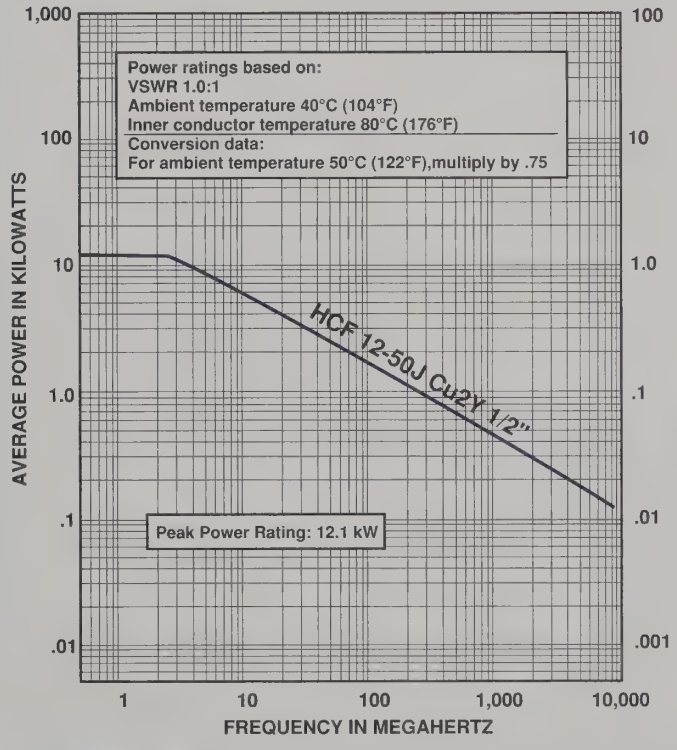
Note: Reel size, volume and weight includes lagging.

The normal tolerance on specified lengths is -0 + 2%. Special tolerances available upon request. Attenuation values are nominal.

ATTENUATION



POWER



CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Cellflex™ Foam Coaxial Cable and Connectors

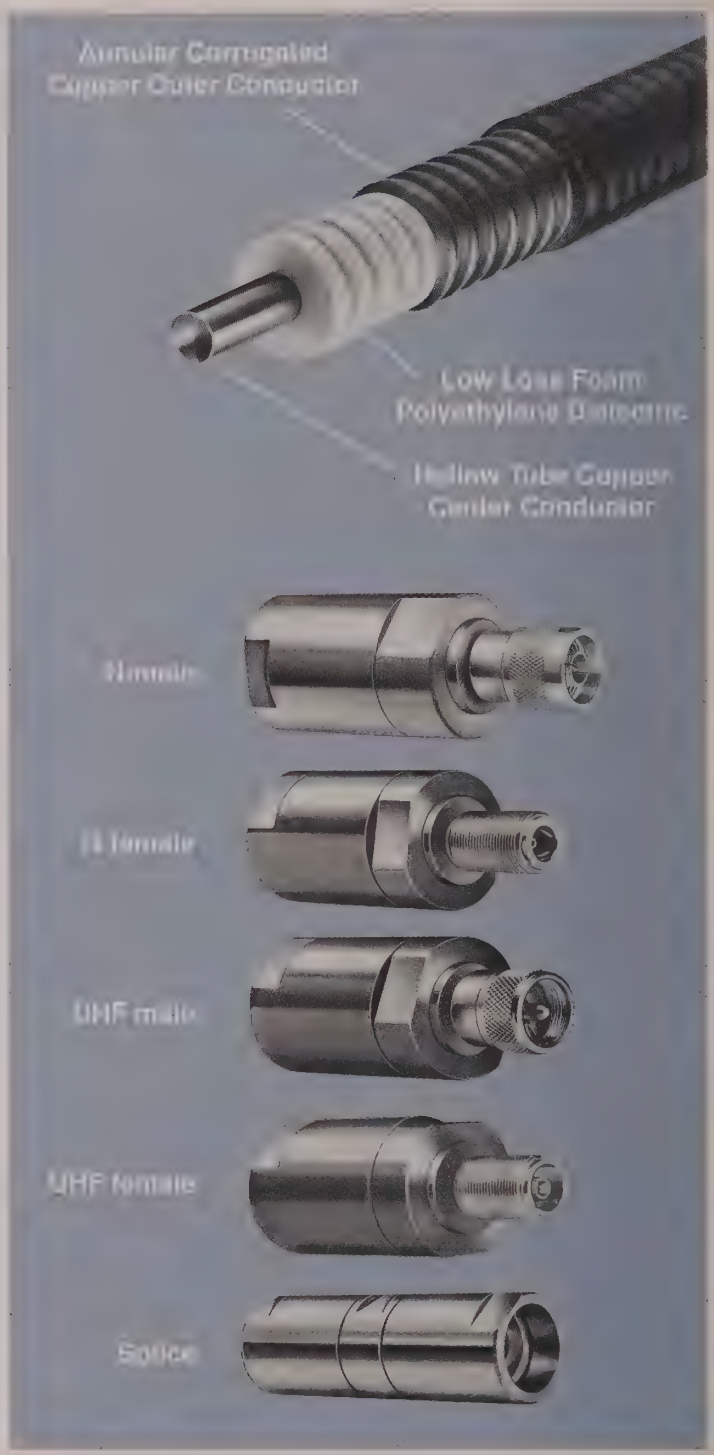
1/2" and 7/8"

1/2" and 7/8" Cellflex™ Foam

FLC 12-50J 810918-001
FLC 78-50J 810921-001

The proprietary design of these Celwave cables features a closed cell foam dielectric with low density and high velocity characteristics. They provide the low loss performance associated with air dielectric cable but eliminate the pressurization problems. Ideal for 25-2500 MHz mobile applications, Cellflex's annularly corrugated outer conductor affords flexibility, crush resistance, moisture migration protection and exceptional cable to connector strength. The center conductor for 1/2" Cellflex is copper clad aluminum. Center conductor for 7/8" is smooth wall copper tube. Connectors are weatherproof, require no soldering or flaring and are easily field installed with common hand tools.

• **Low loss**	Maximizes system performance.
• **No inter-modulation**	Preserves signal to noise ratio of antenna system.
• **Weatherproof**	Assures system reliability.
• **Black polyethylene outer jacket**	Easy handling, environmentally stable.



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Cellflex™ Foam Coaxial Cable and Connectors

ELECTRICAL SPECIFICATIONS

Cable Type (Ordering No.)	Cable Size	Impedance Ohms	Velocity of Propagation Percent	Max. Freq. 90% fco GHz	Attenuation dB/100 ft. (db/100m) 30 MHz	400MHz	1000MHz	Average Power, kW @ 40°C Ambient 30 MHz	400 MHz	1000 MHz
FLC 12-50J (810918-001)	1/2"	50	88	8.0	.37 (1.21)	1.40 (4.59)	2.30 (7.54)	5.0	1.3	.80
FLC 78-50J (810921-001)	7/8"	50	88	5.0	.20 (0.65)	.80 (2.62)	1.37 (4.49)	10.5	2.8	1.7

MECHANICAL SPECIFICATIONS

Cable Type (Ordering No.)	Center Conductor O.D., in. (mm)	Outer Conductor O.D., in. (mm)	Jacket O.D., in. (mm)	Minimum Bending Radius, in. (mm)	Cable Weight lbs/ft (kg/m)
FLC 12-50J (810918-001)	.189 (4.80)	.547 (13.9)	.640 (16.30)	5.0 (127)	.165 (.245)
FLC 78-50J (810921-001)	.357 (9.07)	.990 (25.14)	1.124 (28.55)	10.0 (254)	.40 (.595)

SHIPPING INFORMATION

Cable Type and Length ft. (m) 1/2"	7/8"	Package	Shipping Size inches (mm)	Shipping Volume cu. ft. (cu. m)	Tare Weight lbs. (kg)
0-300 (0-91)	—	Carton	30 x 30 x 5 (762 x 762 x 127)	2.6 (.078)	5 (2.26)
—	0-300 (0-91)	Carton	58 x 58 x 8 (1473 x 1473 x 203)	15.4 (.431)	20 (9.07)
0-500 (0-152)	—	Non-returnable reel	33 dia. x 20 wide (833 x 508)	12.6 (0.35)	106 (48.1)
500-1050 (152-320)	—	Non-returnable reel	43 dia. x 23 wide (1092 x 584)	24.6 (0.69)	211 (96)
1050-5000 (320-1524)	—	Non-returnable reel	51 dia. x 36 wide (1295 x 914)	54.2 (1.53)	342 (155)
—	300-1000 (91-305)	Non-returnable reel	75 dia. x 23 wide (1905 x 584)	74.8 (2.21)	402 (122)
—	1000-1400 (305-347)	Non-returnable reel	78 dia. x 25 wide (1981 x 635)	88.0 (2.49)	578 (260)
—	1400-2150 (347-655)	Non-returnable reel	63 dia. x 31 wide (1600 x 787)	71.2 (2.01)	484 (147)
—	2150-4350 (655-1326)	Non-returnable reel	75 dia. x 44 wide (1905 x 1117)	143.2 (4.05)	716 (218)

Note: Reel size, volume and weight includes lagging.

The normal tolerance on specified lengths is -0 + 2%. Special tolerances available upon request. Attenuation values are nominal.

CONNECTOR DIMENSIONS AND WEIGHT

Ordering No.	Type	Cable Size	Ohms	O.D. in. (mm)	Length in. (mm)	Weight lbs. (kg)
738802	N-male	1/2"	50	1.0 (25)	3.3 (84)	0.4 (0.2)
738841	N-male	7/8"	50	1.5 (38)	3.0 (76)	0.8 (0.4)
738801	N-female	1/2"	50	1.0 (25)	3.1 (79)	0.4 (0.2)
738842	N-female	7/8"	50	1.5 (38)	3.0 (76)	0.8 (0.4)
738804	UHF male	1/2"	50	1.0 (25)	3.0 (76)	0.4 (0.2)
738843	UHF male	7/8"	50	1.5 (38)	3.0 (76)	0.8 (0.4)
738803	UHF female	1/2"	50	1.0 (25)	3.0 (76)	0.4 (0.2)
738844	UHF female	7/8"	50	1.5 (38)	3.0 (76)	0.8 (0.4)
738806	Splice	1/2"	50	1.0 (25)	3.6 (91)	0.6 (0.3)
738846	Splice	7/8"	50	1.5 (38)	4.1 (104)	1.5 (0.6)

To order specify:

1. Cable Type and Ordering Number.
2. Length in feet or meters.
3. Connector Type and Ordering Number; "Attached" (PD1258) or "Unattached".
4. Shipping Instructions.
5. Special Requirements.

Cable Type	Description	Ordering No.
FLC 12-50J	1/2" Cellflex Foam	**810918-001**
FLC 78-50J	7/8" Cellflex Foam	**810921-001**

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DIVISION OF RADIO FREQUENCY SYSTEMS

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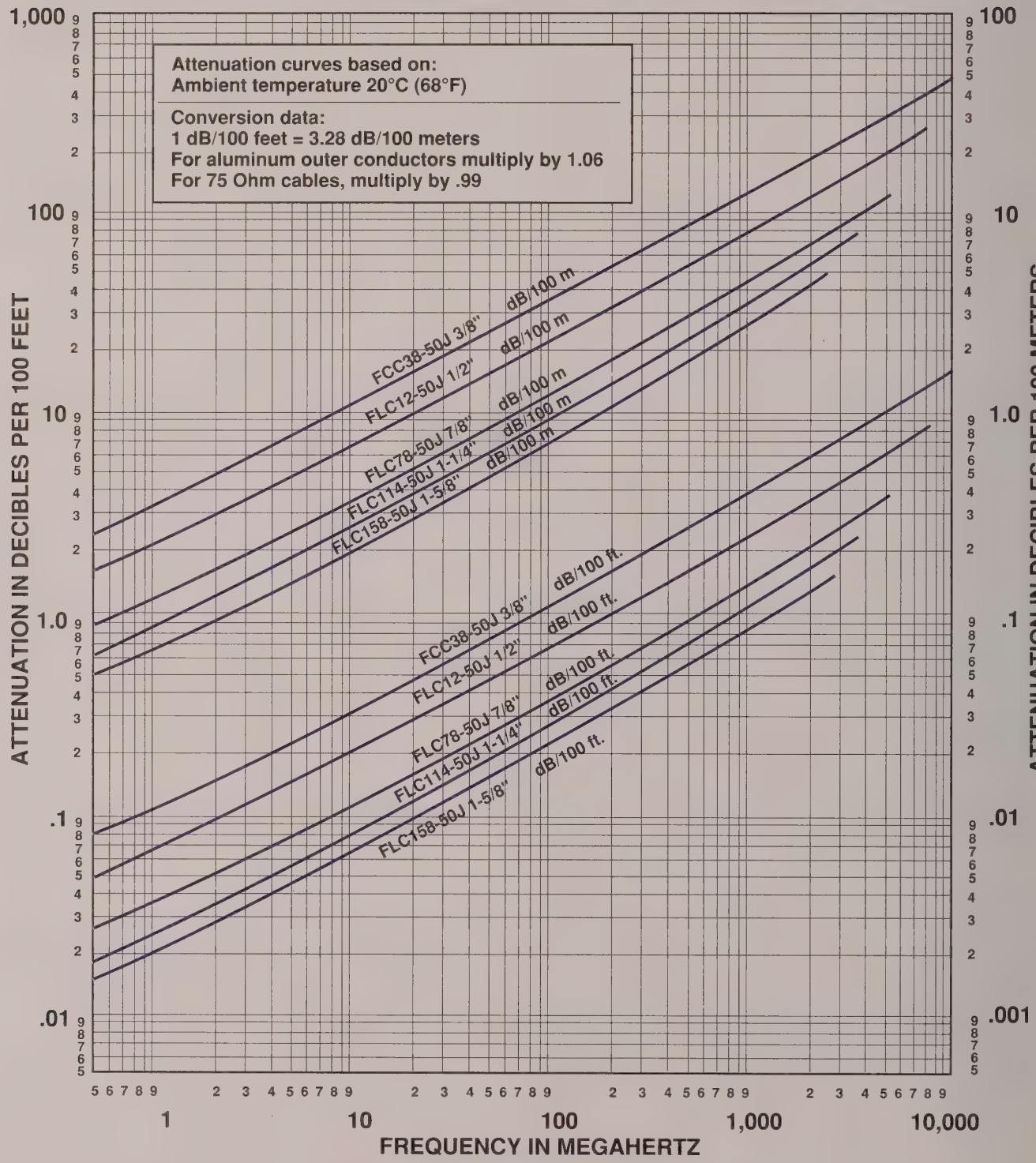
Cellflex™ Foam Cable

Attenuation

CORRUGATED COPPER/50 OHM/FOAM POLYETHYLENE DIELECTRIC



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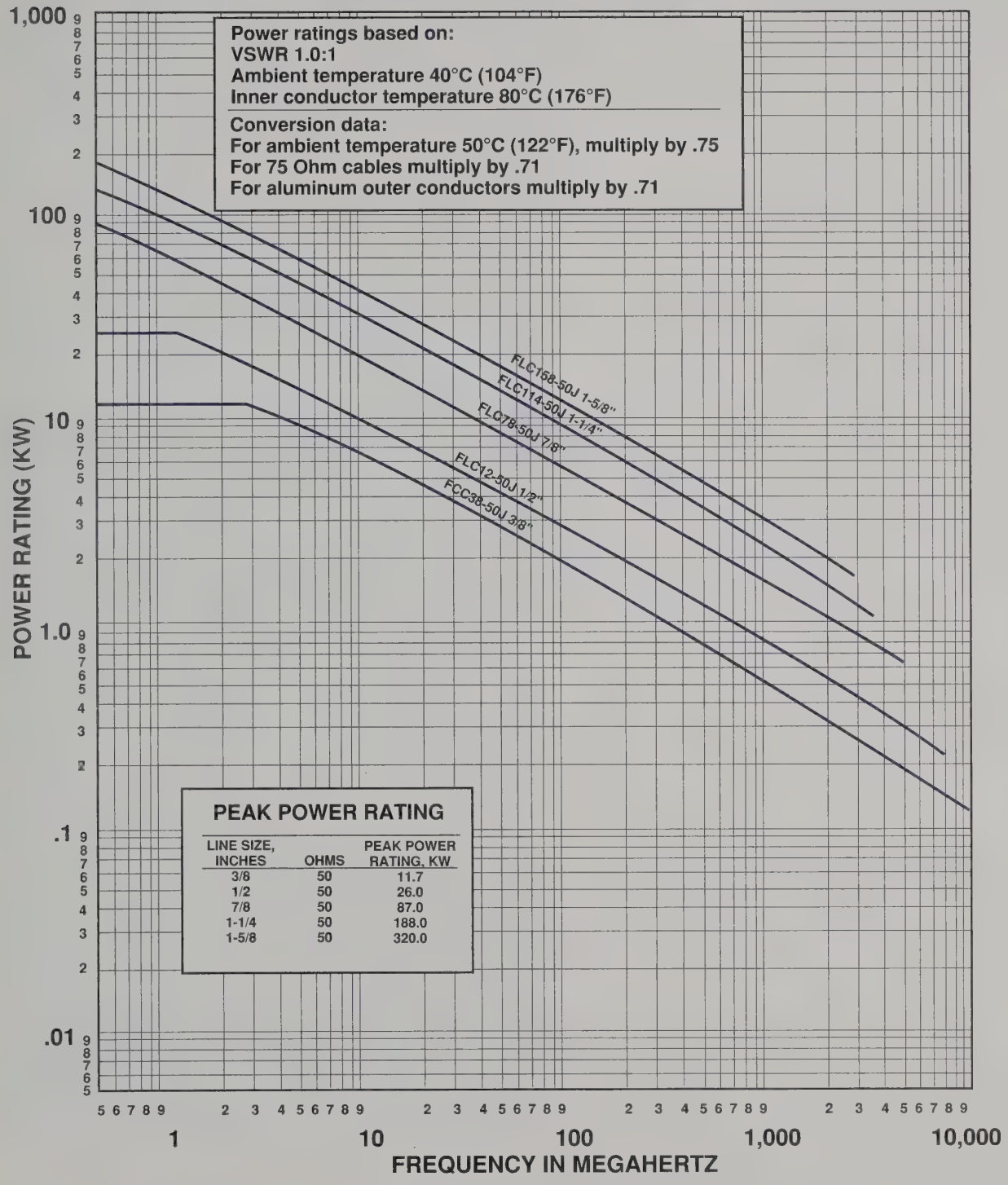
Cellflex™ Foam Cable

Average Power Rating

CORRUGATED COPPER/50 OHM/FOAM POLYETHYLENE DIELECTRIC



PEAK POWER RATING

LINE SIZE, INCHES	OHMS	PEAK POWER RATING, KW
3/8	50	11.7
1/2	50	26.0
7/8	50	87.0
1-1/4	50	188.0
1-5/8	50	320.0

CELWAVE RFS
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Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Cellflex™ Foam Coaxial Cable and Connectors

1-1/4" and 1-5/8"

1-1/4" and 1-5/8" Cellflex™ Foam

FLC 114-50J 810916-001
FLC 158-50J 810920-001

These Celwave cables offer high power for many land mobile applications. Their proprietary design features a closed cell foam dielectric with low density and high velocity characteristics. They provide the low loss performance associated with air dielectric cable but eliminate the pressurization problems. Ideal for 25-2500 MHz mobile applications, annularly corrugated outer conductor affords flexibility, crush resistance, moisture migration protection and exceptional cable to connector strength. Center conductor for both 1-1/2" and 1-5/8" diameters is corrugated copper tube. Connectors are weather-proofed, require no soldering or flaring and are easily field installed with common hand tools.

• **Low loss**	Maximizes system performance.
• **No inter-modulation**	Preserves signal to noise ratio of antenna system.
• **Weatherproof**	Assures system reliability.
• **Black polyethylene outer jacket**	Easy handling, environmentally stable.

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Cellflex™ Foam Coaxial Cable and Connectors

ELECTRICAL SPECIFICATIONS

Cable Type (Ordering No.)	Cable Size	Impedance Ohms	Velocity of Propagation Percent	Max. Freq. 90% fco GHz	Attenuation dB/100 ft. (dB/100m) 30 MHz	400MHz	1000MHz	Average Power, kW @ 40°C Ambient 30 MHz	400 MHz	1000 MHz
FLC 114-50J (810916-001)	1-1/4"	50	88	3.4	0.15 (0.49)	0.61 (2.0)	1.05 (3.44)	18	4.0	2.4
FLC 158-50J (810920-001)	1-5/8"	50	88	2.7	0.118 (0.39)	0.48 (1.57)	0.87 (2.85)	23	5.2	3.0

MECHANICAL SPECIFICATIONS

Cable Type (Ordering No.)	Center Conductor O.D., in. (mm)	Outer Conductor O.D., in. (mm)	Jacket O.D., in. (mm)	Minimum Bending Radius, in. (mm)	Cable Weight lbs/ft (kg/m)
FLC 114-50J (810916-001)	0.53 (13.46)	1.418 (36.02)	1.58 (40.13)	15 (380)	0.695 (1.034)
FLC 158-50J (810920-001)	0.68 (17.27)	1.83 (46.48)	2.015 (51.18)	20 (508)	0.92 (1.369)

SHIPPING INFORMATION

Cable Type and Length ft. (m) 1-1/4"	1-5/8"	Package	Shipping Size inches (mm)	Shipping Volume cu. ft. (cu. m)	Tare Weight lbs. (kg)
0-500 (0-152)	75-230 (23-70)	Non-returnable reel	75 dia. x 23 wide (1905 x 584)	74.8 (2.12)	402 (122)
500-700 (152-213)	230-400 (70-122)	Non-returnable reel	78 dia. x 25 wide (1981 x 635)	88.0 (2.50)	578 (260)
700-1200 (213-366)	400-680 (122-207)	Non-returnable reel	83 dia. x 35 wide (2108 x 889)	139.5 (3.95)	754 (342)
1200-2000 (366-610)	680-800 (207-244)	Non-returnable reel	83 dia. x 41 wide (2108 x 1041)	163.4 (4.62)	848 (384)
2000-5000 (610-1524)	800-1400 (244-427)	Non-returnable reel	91 dia. x 23 wide (2311 x 584)	196.4 (5.56)	949 (430)
–	1400-2950 (427-899)	Non-returnable reel	101 dia. x 59 wide (2565 x 1499)	348.3 (9.86)	1718 (779)
–	2950-5000 (899-1524)	Non-returnable reel	111 dia. x 60 wide (2819 x 1524)	427.8 (11.70)	1906 (864)

Note: Reel size, volume and weight includes lagging.

The normal tolerance on specified lengths is -0 + 2%. Special tolerances available upon request. Attenuation values are nominal.

CONNECTOR DIMENSIONS AND WEIGHT

Ordering No.	Type	Cable Size	Ohms	O.D. in. (mm)	Length in. (mm)	Weight lbs. (kg)
738882	N-male	1-1/4"	50	2.0 (50.8)	3.9 (99)	1.4 (0.6)
738888 (GP)	N-male	1-1/4"	50	2.0 (50.8)	3.9 (99)	1.4 (0.6)
738850	N-male	1-5/8"	50	2.5 (63)	5.0 (127)	3.0 (1.3)
738883	N-female	1-1/4"	50	2.0 (50.8)	4.0 (101.6)	1.4 (0.6)
738889 (GP)	N-female	1-1/4"	50	2.0 (50.8)	4.0 (101.6)	1.4 (0.6)
738851	N-female	1-5/8"	50	2.5 (63)	5.2 (130)	3.0 (1.3)
738885	Splice	1-1/4"	50	2.0 (50.8)	6.1 (154.9)	2.5 (1.1)
738855	Splice	1-5/8"	50	2.5 (63)	4.7 (119)	4.5 (2.0)

(GP) Gas Pass

To order, specify:

1. Cable Type and Ordering Number.
2. Length in feet or meters.
3. Connector Type and Ordering Number; "Attached" (PD1256) or "Unattached".
4. Shipping Instructions.
5. Special Requirements.

Cable Type	Description	Ordering No.
FLC 114-50J	1-1/4" Cellflex Foam	**810916-001**
FLC 158-50J	1-5/8" Cellflex Foam	**810920-001**

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Flexwell® Air Dielectric Coaxial Cable and Connectors

1/2" and 7/8"

1/2" and 7/8" Flexwell® Air Dielectric

HCC 12-50J	810901-001
HCC 78-50J	810929-001

These Celwave cables combine flexibility, strength and superior performance for land mobile applications in the 25-2500 MHz band. Their helix is precisely extruded onto the center conductor for better uniformity, lower attenuation and improved mechanical stability. The center conductor for 1/2" Flexwell is copper clad aluminum. Center conductor for 7/8" is copper hollow tube. Both are protected by a black polyethylene jacket.

- **Low loss** — Maximizes system performance.
- **Locked insulator construction** — Maintains performance through hot and cold; no seasonal variation.
- **Black polyethylene outer jacket** — Easy handling, environmentally stable.

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Flexwell® Air Dielectric Coaxial Cable and Connectors

ELECTRICAL SPECIFICATIONS

Cable Type (Ordering No.)	Cable Size	Impedance Ohms	Velocity of Propagation Percent	Max. Freq. 90% fco GHz	Attenuation dB/100 ft. (dB/100m) 30 MHz	400MHz	1000MHz	Average Power, kW @ 40°C Ambient 30 MHz	400 MHz	1000 MHz
HCC 12-50J (810901-001)	1/2"	50	91.5	11.3	.455 (1.49)	1.72 (5.64)	2.79 (9.15)	3.7	.98	.61
HCC 78-50J (810929-001)	7/8"	50	91.5	5.13	.202 (.66)	.783 (2.56)	1.29 (4.23)	13	3.3	2.1

MECHANICAL CHARACTERISTICS

Cable Type (Ordering No.)	Center Conductor O.D., in. (mm)	Outer Conductor O.D., in. (mm)	Jacket O.D., in. (mm)	Minimum Bending Radius, in. (mm)	Cable Weight lbs/ft (kg/m)
HCC 12-50J (810901-001)	.16 (4.06)	.484 (12.29)	.584 (14.83)	5 (127)	.182 (.271)
HCC 78-50J (810929-001)	.354 (8.99)	1.00 (25.4)	1.10 (27.94)	10 (254)	.53 (.788)

SHIPPING INFORMATION

Cable Type and Length ft. (m) 1/2"	7/8"	Package	Shipping Size inches (mm)	Shipping Volume cu. ft. (cu. m)	Tare Weight lbs. (kg)
0-500 (0-152)	—	Non-returnable reel	33 dia. x 20 wide (833 x 508)	12.6 (0.35)	106 (48)
500-1050 (152-320)	—	Non-returnable reel	43 dia. x 23 wide (1092 x 584)	24.6 (0.69)	211 (96)
1050-5000 (320-1524)	—	Non-returnable reel	51 dia. x 36 wide (1295 x 914)	54.2 (1.53)	342 (155)
—	0-1000 (0-305)	Non-returnable reel	75 dia. x 23 wide (1905 x 584)	74.8 (2.12)	402 (182)
—	1000-1400 (305-427)	Non-returnable reel	78 dia. x 25 wide (1981 x 635)	88.0 (2.49)	578 (262)
—	1400-2150 (427-655)	Non-returnable reel	63 dia. x 31 wide (1600 x 1168)	71.2 (2.99)	484 (219)
—	2150-4350 (655-1326)	Non-returnable reel	75 dia. x 44 wide (1905 x 1117)	143.2 (4.05)	716 (324)

Note: Reel size, volume and weight includes lagging.

Maximum lengths of 7/8" cable with 7/8" EIA connectors attached are 25% less than listed cable lengths without connectors. The normal tolerance on specified lengths is -0 + 2%. Special tolerances available upon request. Attenuation values are nominal.

CONNECTOR DIMENSIONS AND WEIGHT

Ordering No.	Type	Cable Size	Ohms	O.D. in. (mm)	Length in. (mm)	Weight lbs. (kg)
738230*	7/8" EIA (GP)	7/8"	50	1.4 (36)	4.2 (106)	1.5 (0.7)
738229*	7/8" EIA (GB)	7/8"	50	1.4 (36)	4.2 (106)	1.5 (0.7)
738200	N-male	1/2"	50	1.0 (25)	3.2 (81)	0.5 (0.2)
738225	N-male	7/8"	50	1.4 (36)	3.9 (99)	0.9 (0.4)
738201	N-female	1/2"	50	1.0 (25)	3.2 (82)	0.5 (0.2)
738226	N-female	7/8"	50	1.4 (36)	3.9 (99)	0.8 (0.4)
738204	Splice	1/2"	50	1.0 (25)	3.4 (87)	0.6 (0.3)
738231	Splice	7/8"	50	1.4 (36)	4.7 (119)	1.2 (0.5)

*Inner connector supplied loose.
GP (Gas Pass)
GB (Gas Barrier)

To order, specify:

1. Cable Type and Ordering Number.
2. Length in feet or meters.
3. Connector Type and Ordering Number; "Attached" (PD1256) or "Unattached".
4. Shipping Instructions.
5. Special Requirements.

Cable Type	Description	Ordering No.
HCC 12-50J	1/2" Flexwell Air	**810901-001**
HCC 78-50J	7/8" Flexwell Air	**810929-001**

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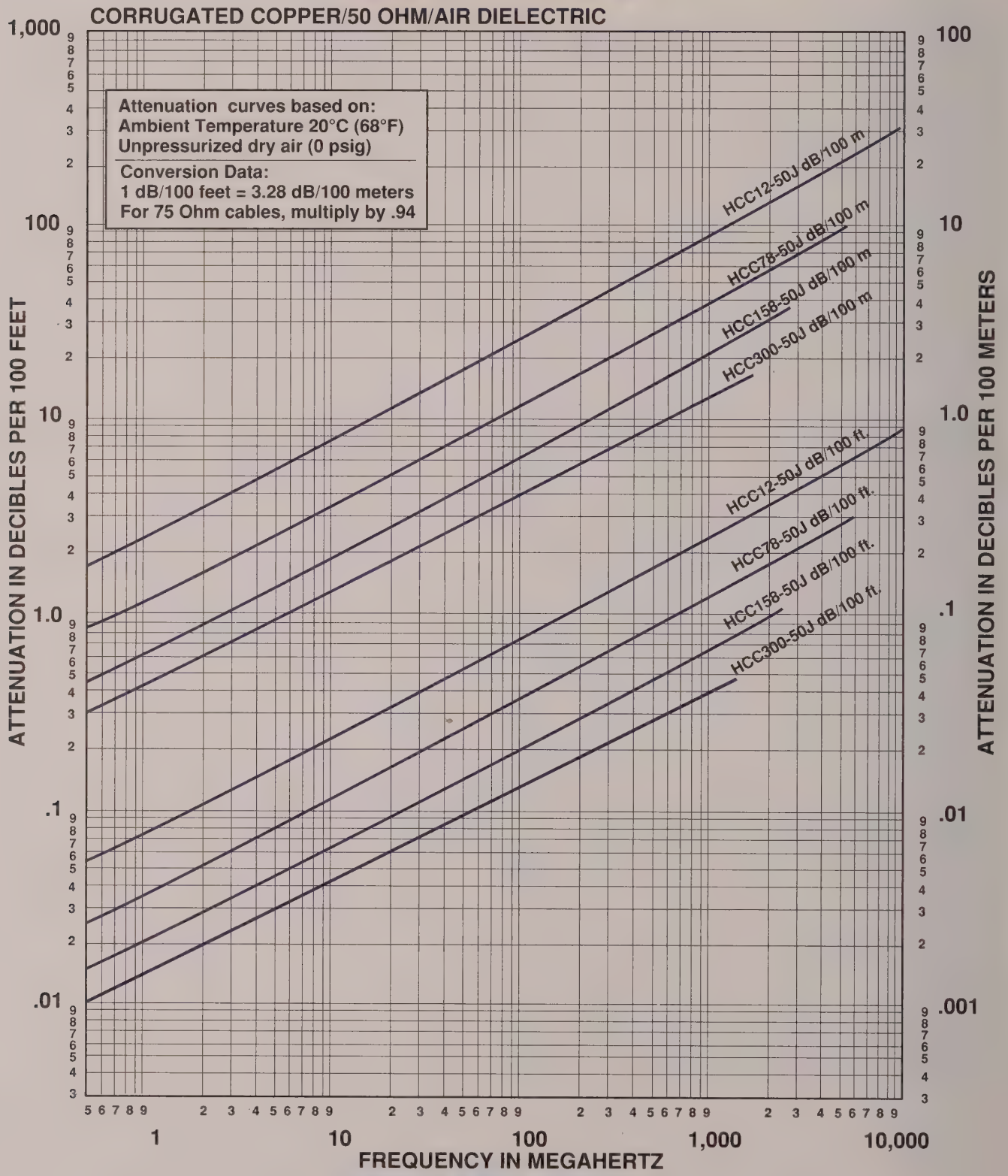
Flexwell® Air Cable

Attenuation



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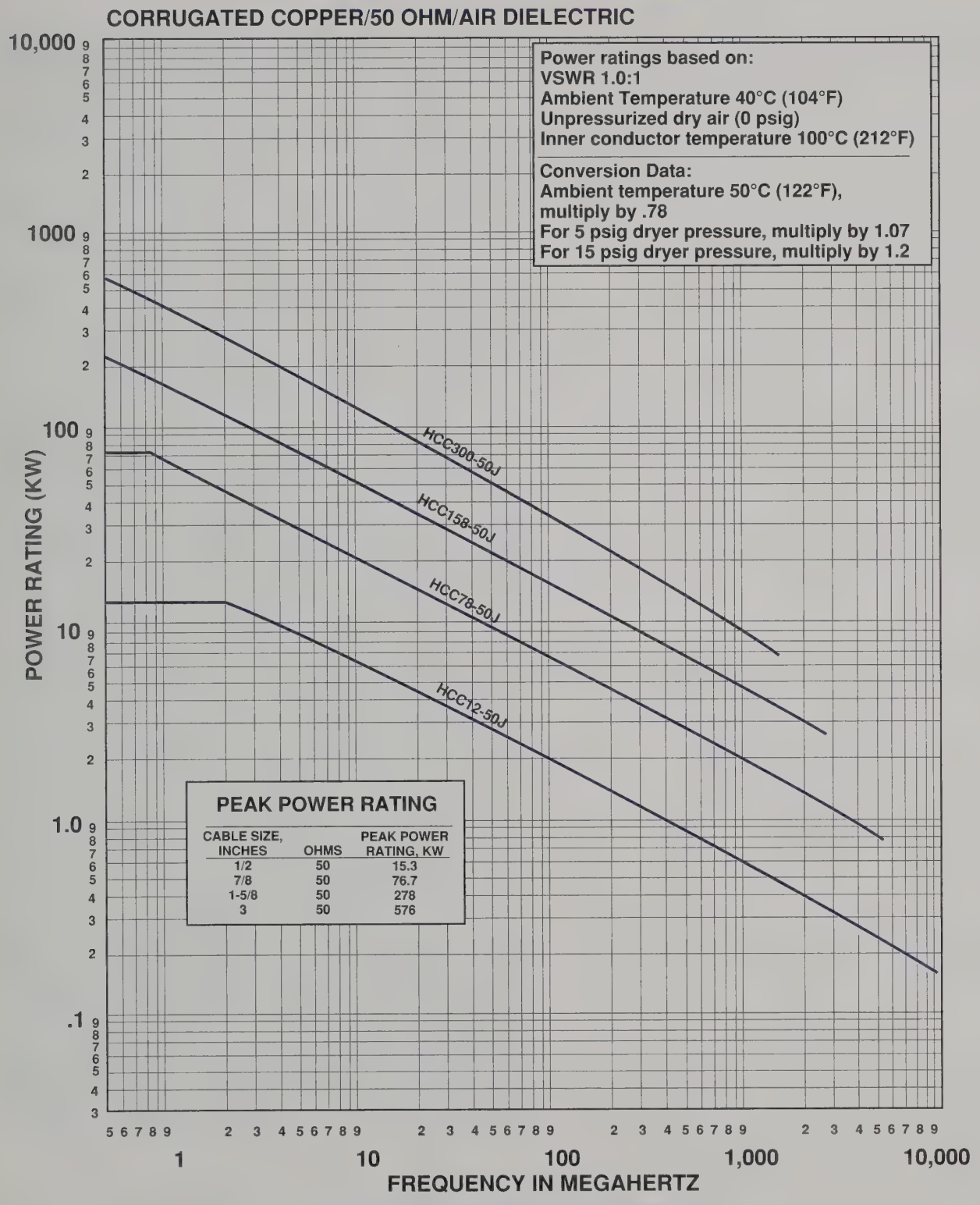
Flexwell® Air Cable

Average Power Rating



PEAK POWER RATING

CABLE SIZE, INCHES	OHMS	PEAK POWER RATING, KW
1/2	50	15.3
7/8	50	76.7
1-5/8	50	278
3	50	576

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Flexwell® Air Dielectric Coaxial Cable and Connectors

1-5/8" and 3"

1-5/8" and 3" Flexwell® Air Dielectric

HCC 158-50J 810903-001
HCC 300-50J 810905-001

These Celwave cables are used extensively in high power land mobile applications from 25 to 2500 MHz. They combine flexibility, strength and superior performance with better uniformity, lower attenuation and improved mechanical stability. Their design includes a corrugated, tubular copper center conductor, spiral polyethylene dielectric, corrugated outer conductor and black polyethylene outer jacket.

• **Low loss**	Maximizes system performance.
• **Locked insulator construction**	Maintains performance through hot and cold; no seasonal variation.
• **Black polyethylene outer jacket**	Easy handling, environmentally stable.

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

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Flexwell® Air Dielectric Coaxial Cable and Connectors

ELECTRICAL SPECIFICATIONS

Cable Type (Ordering No.)	Cable Size	Impedance Ohms	Velocity of Propagation Percent	Max. Freq. 90% fco GHz	Attenuation dB/100 ft. (dB/100m) 30 MHz	400MHz	1000MHz	Average Power, kW @ 40°C Ambient 30 MHz	400 MHz	1000 MHz
HCC 158-50J (810903-001)	1-5/8"	50	95	2.74	.110 (.36)	.417 (1.36)	.699 (2.29)	29	7.8	4.9
HCC 300-50J (810905-001)	3"	50	96	1.63	.075 (.24)	.270 (.89)	.454 (1.43)	70	17	9.15

MECHANICAL SPECIFICATIONS

Cable Type (Ordering No.)	Center Conductor O.D., in. (mm)	Outer Conductor O.D., in. (mm)	Jacket O.D., in. (mm)	Minimum Bending Radius, in. (mm)	Cable Weight lbs/ft (kg/m)
HCC 158-50J (810903-001)	0.732 (18.6)	1.83 (46.4)	1.996 (51)	20 (508)	0.864 (.388)
HCC 300-50J (810905-001)	1.150 (29.2)	2.85 (72.4)	2.99 (75.94)	30 (762)	1.423 (2.118)

SHIPPING INFORMATION

Cable Type and Length ft. (m) 1-5/8"	3"	Package	Shipping Size inches (mm)	Shipping Volume cu. ft. (cu. m)	Tare Weight lbs. (kg)
0-270 (0-82)	—	Non-returnable reel	75 dia. x 23 wide (1905 x 584)	74.8 (2.12)	402 (182)
270-400 (82-122)	—	Non-returnable reel	78 dia. x 25 wide (1981 x 635)	88.0 (2.49)	578 (262)
400-800 (122-244)	0-350 (0-107)	Non-returnable reel	83 dia. x 35 wide (2108 x 889)	139.5 (3.95)	754 (342)
800-1100 (244-335)	350-400 (107-122)	Non-returnable reel	83 dia. x 41 wide (2108 x 1041)	163.4 (4.62)	848 (384)
1100-1800 (335-549)	400-700 (122-213)	Non-returnable reel	91 dia. x 41 wide (2311 x 1041)	196.4 (5.56)	949 (430)
1800-3000 (549-914)	700-1400 (213-427)	Non-returnable reel	101 dia. x 65 wide (2565 x 1651)	383.6 (10.86)	1718 (779)
3000-5000 (914-1524)	1400-2250 (427-686)	Non-returnable reel	111 dia. x 60 wide (2819 x 1524)	427.8 (11.70)	2224 (1009)

Note: Reel size, volume and weight includes lagging.

Maximum lengths of 1-5/8" cable with 1-5/8" EIA connectors attached are 25% less than listed cable lengths without connectors. Maximum lengths of 3" cable with 3-1/8" EIA connectors attached are 25% less than listed cable lengths without connectors. The normal tolerance on specified lengths is -0 + 2%. Special tolerances available upon request. Attenuation values are nominal.

CONNECTOR DIMENSIONS AND WEIGHT

Ordering No.	Type	Cable Size	Ohms	O.D. in. (mm)	Length in. (mm)	Weight lbs. (kg)
738314*	1-5/8" EIA (GP)	1-5/8"	50	2.5 (63)	4.4 (113)	4.0 (1.8)
738303*	1-5/8" EIA (GB)	1-5/8"	50	2.5 (63)	4.4 (113)	4.0 (1.8)
738355*	3-1/8" EIA (GP)	3"	50	5.2 (131)	7.9 (200)	11 (5.0)
738350*	3-1/8" EIA (GB)	3"	50	5.2 (131)	7.9 (200)	11 (5.0)
738301	N-female	1-5/8"	50	2.5 (63)	5.2 (131)	3.2 (1.5)
738305	Splice	1-5/8"	50	2.5 (63)	4.7 (119)	5.8 (2.6)
738352	Splice	3"	50	3.5 (89)	7.4 (187)	11 (5.0)

*Inner connector supplied loose.
GP (Gas Pass)
GB (Gas Barrier)

To order, specify:

1. Cable Type and Ordering Number.
2. Length in feet or meters.
3. Connector Type and Ordering Number; "Attached" (PD1256) or "Unattached".
4. Shipping Instructions.
5. Special Requirements.

Cable Type	Description	Ordering No.
HCC 158-50J	1-5/8" Flexwell Air	**810903-001**
HCC 300-50J	3" Flexwell Air	**810905-001**

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RG8A/U, RG214/U, RG393/U, LLFLEX12

RG8A/U Coaxial Cable type RG8A/U, 50 Ohm nominal impedance is suitable for low band installations, short cable runs at 150 MHZ and short interconnecting cables at 450 MHz. The attenuation and maximum power handling capabilities are: @ 50 MHz–1.3 dB and 1300 Watts, @ 100 MHz–2.2 dB and 850 Watts, @ 400 MHz–4.6 dB and 350 Watts.

RG214/U Coaxial Cable type RG214/U, 50 Ohm nominal impedance features a double braided silver covered copper shielding, a polyethylene dielectric and black polyvinylchloride, non-contaminating outer jacket. Its attenuation and power handling capabilities match the specifications given for RG8A/U.

RG393/U Coaxial Cable type RG393/U, a 50 Ohm nominal impedance features a solid Teflon® dielectric material and a fluorinated ethylene propylene outer jacket suitable for high temperature high power applications. It is rated at 4,300 Watts @ 200 MHz, 2,800 Watts @ 400 MHz, 1,700 Watts @ 1000 MHz. Attenuation per hundred feet is lower than RG8A/U and RG214/U i.e.: 2.10 dB @ 100 MHZ, 4.50 dB @ 400 MHz and 7.5 dB @ 1000 MHz.

LLFLEX12 Highly flexible foam dielectric Coaxial Cable/50 Ohm impedance features a low loss dielectric, a solid-sheath outer conductor for excellent shielding and a flexible low bending radius (1.17 inches; 30 mm). At 1000 MHz attenuation per hundred feet is 3.4 dB (11.2 dB/100 m), the average power rating at 800 MHz is 0.59kW. Supplied in 36", 72" and 96" long jumper assemblies.

APPLICATIONS

Flexible jumpers are used to connect an antenna's (fixed) termination to a semi-rigid, solid shielded transmission line. Jumpers are also used to connect duplexers, receiver multicouplers, transmitter combiners, etc., to the same semi-rigid transmission line or the radio equipment. Four standard lengths [18" (457 mm), 36" (914 mm), 72" (1829 mm), 96" (2438 mm)] of flexible jumpers complete with neoprene weather shield and connectors are specified below. Note: some jumpers applications require non-standard lengths, contact our Customer Service Department for assistance. Cable kits are available for expanding receiver multicouplers and transmitter combiners. See section on expansion kits.

Coaxial Cables, Connectors and Jumpers

JUMPER ASSEMBLIES

Cable	UHF (M)/UHF (F)* *(with Barrel)	UHF (M)/Type-N (M)	Type-N (M)/Type-N (M)
RG8A/U Type			
18"	PD370-18	PD374-18	PD371-18
36"	PD370-36	PD374-36	PD371-36
72"	PD370-72	PD374-72	PD371-72
96"	PD370-96	PD374-96	PD371-96
RG214/U Type			
18"	PD10090-18	PD10089-18	PD10088-18
36"	PD10090-36	PD10089-36	PD10088-36
72"	PD10090-72	PD10089-72	PD10088-72
96"	PD10090-96	PD10089-96	PD10088-96
RG393/U Type			
18"	PD1190-18	PD1191-18	PD1189-18
36"	PD1190-36	PD1191-36	PD1189-36
72"	PD1190-72	PD1191-72	PD1189-72
96"	PD1190-96	PD1191-96	PD1189-96
LLFLEX12			
36"	—	—	PD10091-36
72"	—	—	PD10091-72
96"	—	—	PD10091-96

CONNECTOR MATRIX

Cable	UHF Barrel (F)	UHF (M)	Type-N (F)	Type-N (M)
RG8A/U	PL258	PL259-T (Teflon® Insulated)	UG1186/U	UG1185/U
RG214/U	PL258	PL259-T (Teflon® Insulated)	UG1186/U	UG1185/U
RG393/U	PL258	PL259-T (Teflon® Insulated)	UG1186/U	UG1185/U

Coaxial Cable Accessories

PD295-25 and 910061-000
Stainless Steel Strapping Kits.
Straptite Stainless Steel Cable Strapping Kits are composed of a coil of 1/2 in. (12.7 mm) wide special alloy stainless steel, a tightening buckle for each foot of tape and a set of installation tools. To order: PD295-25 contains 25 ft. (7.6 m) stainless steel strapping; 910061-000 contains 100 ft. (30.5 m) stainless steel strapping.

PD10057 Nylon Cable Tie Kit.
A kit of 50 heavy duty, black, weather resistant straps for attaching 1/2 inch to 7/8 inch cables directly to tower members. Maximum spacing 3 feet (914 mm). Maximum bundle diameter including tower member is 8 inches (203 mm). Meets Mil Spec MS3367-6.

PD255 Weatherproof Housing.
Neoprene Housing designed for weatherproofing junction of antenna flexible cable extension and a main transmission line (supplied with each flexible cable extension). Sold in packages of ten.

PD151 Rotary Cutter.
Cutter for cable up to 1-1/4" diameter with built-in blade and quick release jaws.

PD477 Cable Grounding Clamp.
Cable Grounding Clamp is an all stainless steel assembly for use in grounding 1/2 inch (12.7 mm) and 7/8 inch (22.2 mm) cables. A split bolt type attachment is provided for a No. 6 ground wire (not supplied). Sold in packages of three.

PD275 Polyken Tape.
A 3/4 inch (19 mm) wide by 20 foot (6.1 m) long roll of black all weather PVC electrical tape. Ideal for weatherproofing connectors, etc. Sold in packages of ten rolls.

PD395 and PD593 Lightning Arrestors.
Minimize lightning risk to costly two-way radio equipment with these easily installed lightning arrestors.

SPECIFICATIONS	PD593	PD395
Termination (Both Ends)	UHF Female	N-female
Power Rating	1 kilowatt	500 Watts
Breakdown Voltage	500 V. Min. 2000 V. Max.	500 V. Min. 2000 V. Max.
VSWR	Under 1.03:1 to 500 MHz	1.1:1 to 1000 MHz
Insertion Loss	Less than .05 dB	Less than .05 dB

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Coaxial Cable Accessories

Straps for Copper Sheathed Cables.
Cable straps used to affix FX and LLF cable to interior wall surfaces.

PD176-514C.
Double hole cable strap for 1/2 inch (12.7 mm) jacketed cable.

PD176-516C.
Double hole cable strap for 7/8 inch (22.2 mm) jacketed cable.

Non-Insulated Cable Hangers.
Corrosion resistant stainless steel cable hangers may be attached using an angle or round member adapter. Recommended spacing: every 3 ft. (1 m). Ten hangers per kit.

Cable Diameter in. (mm)	Ordering Number with slot for round member adapter	Ordering Number without slot for angle member adapter
1/2 (12.7)	920159-001	920691-007
7/8 (22.2)	920981-007	NA
1-1/4 (31.8)	920981-004	NA
1-5/8 (41.3)	920159-003	920691-003

Round Member Adapter Kit.
Stainless steel hose clamp mounts non-insulated cable hangers to round members. Ten adapters per kit.

Member Diameter - in. (mm)	Ordering Number
1 to 2 (25-51)	514542-001
2 to 3 (51-76)	514542-002
3 to 4 (76-102)	514542-003
4 to 5 (102-127)	514542-004
5 to 6 (127-152)	514542-005
6 to 7 (152-178)	514542-006

Angle Member Adapter Kit.
Fastens non-insulated cable hangers to angle members without drilling. Ten adapters per kit.

Ordering Number	Hanger Type in. (mm)	Jaw Opening in. (mm)
920167-001	1/2 (12.7)	3/4 (19.1)
920167-004	7/8 to 3-1/2 (22.2 - 88.9)	7/8 (22.2)

Coaxial Cable Accessories

Cable Grounding Straps.
713737-002 for 1/2 in. (12.7 mm) cable.
713737-004 for 7/8 in. (22.2 mm) cable.
713737-005 for 1-5/8 in. (41.3 mm) and 1-1/4 in. (31.7 mm) cable.
713737-006 for 3 in. (76mm) and 31/2 in. (88.9 mm) cable.
Used to ground jacketed or unjacketed copper cables to the tower structure. Recommend one grounding kit at vertical portion of cable run near tower base and one at top of cable run. Consists of: cable clamp, 2 ft. copper strap and lug, sealing compound and tape.

Cable Hoisting Grips.
910307-000 for 7/8 in. (22.2 mm) cable.
910303-000 for 1/2 in. (12.7 mm) cable.
910311-000 for 1-5/8 in. (41.3 mm) and 1-1/4 in. (31.7 mm) cable.
Hoisting grips are the split type and may be affixed with lacing supplied. Recommended intervals are 200 ft. (60 m). Grips may be left on tower as top hanger if desired.

Wall/Roof Feed Through.
Galvanized steel wall/roof feed through includes plastic sealing compound.

Cable Diameter - in. (mm)	Ordering Number
1/2 (12.7)	**920432-002**
7/8 (22.2)	**920433-000**
1-1/4 (31.7)	**920867-000**
1-5/8 (41.3)	**920434-000**

Adapters.
Plate Reducer. Quick step type. Male inner connectors on both ends. "O" rings and hardware included for both ends.

Ordering Number	920247	920248
Size	1-5/8"–7/8"	3-1/8"–1-5/8"
Impedance - Ohms	50	50
Dimensions - in. (mm)		
A	3/4 (19.0)	7/8 (22.2)
B	3-1/2 (88.9)	5-3/16 (131.8)
Weight - lbs. (kg)		
Net	3.0 (1.36)	5.0 (2.27)
Shipping	3.6 (1.63)	5.8 (2.63)

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Coaxial Cable Accessories

Taper Reducer. Low VSWR (1.05 @ 1.0 GHz). Fixed flange large end, swivel flange small end. Unsupported inner conductor. Removable anchor inner connector, "O" ring and hardware included for smaller size flange only.

Ordering Number	920249	920250
Size	1-5/8"–7/8"	3-1/8"–1-5/8"
Impedance - Ohms	50	50
Dimensions - in. (mm)		
A	4-27/64 (112.3)	7-3/32 (180.0)
B	3-1/2 (88.9)	5-3/16 (131.8)
C	2-1/4 (57.2)	3-1/2 (88.9)
Weight - lbs. (kg)		
Net	1.75 (0.8)	4.1 (1.9)
Shipping	2.4 (1.1)	5.0 (2.3)

Adapter. EIA to type N-female with anchor inner connector. Mates with UG21/U. Gas tight with 1/8" FPT pressure inlet and plug.

Ordering Number	920241	920242	920243
Size	7/8"	1-5/8"	3-1/8"
Impedance - Ohms	50	50	50
Dimensions - in. (mm)			
A	3-5/8 (92.0)	5 (127.0)	6 (152.4)
B	2-1/4 (57.2)	3-1/2 (88.9)	5-3/16 (131.8)
Weight - lbs. (kg)			
Net	.6 (.3)	2.0 (.9)	6.0 (2.7)
Shipping	.9 (.4)	2.7 (1.2)	6.8 (3.1)

Adapter. EIA to LC female with anchor inner connector. Mates with UG154/U.

Ordering Number	920244	920245	920246
Size	7/8"	1-5/8"	3-1/8"
Impedance - Ohms	50	50	50
Dimensions - in. (mm)			
A	3-3/4 (95.3)	5-1/4 (133.4)	5-7/16 (138.1)
B	2-1/4 (57.2)	3-1/2 (88.9)	5-3/16 (131.8)
Weight - lbs. (kg)			
Net	1.2 (.5)	3.5 (1.6)	6.3 (2.9)
Shipping	1.4 (.6)	4.2 (1.9)	7.1 (3.2)

Mounting Hardware.
Hardware set Stainless Steel.

Ordering Number	920272	920273	920274
Size	7/8"	1-5/8"	3-1/8"
Quantity per set	3	4	6
Dimensions - in. (mm)			
A	7/16 (11.1)	1/2 (12.7)	9/16 (14.3)
B	1 (25.4)	1-1/2 (38.1)	1-1/2 (38.1)
C (Thread)	1/4-20 UNC	5/16-18 UNC	3/8-16 UNC

Ordering Number	926222	920275	926285
Size	4-1/16"	6-1/8"	9-3/16"
Quantity per set	8	12	20
Dimensions - in. (mm)			
A	9/16 (14.3)	9/16 (14.3)	9/16 (14.3)
B	1-1/2 (38.1)	1-3/4 (44.5)	2-1/4 (57.1)
C (Thread)	3/8-16 UNC	3/8-16 UNC	3/8-16 UNC

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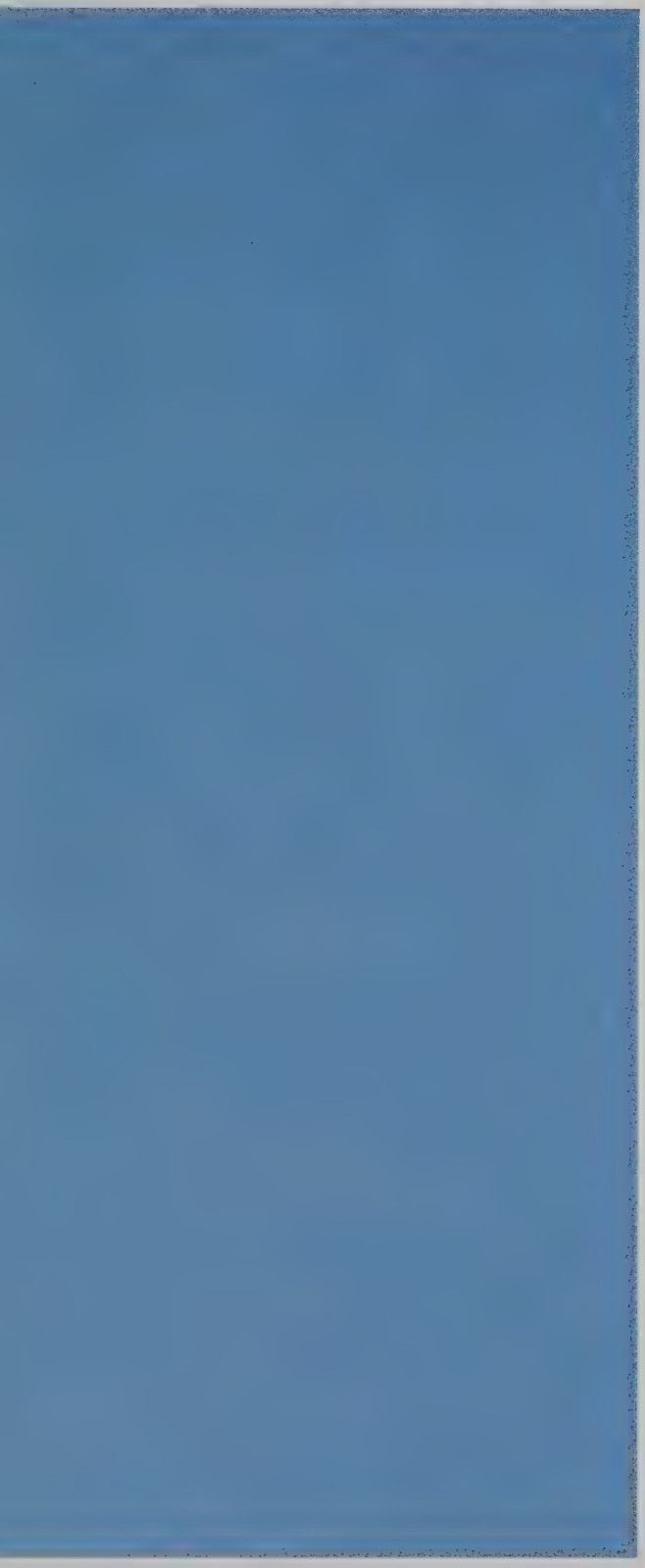
From here the word goes out all over Maricopa County.



The Orangewood Church of The Nazarene fills both a spiritual and cellular need in this part of Arizona. One function is obvious. The other isn't.

It happened this way.

There are no major hills in this part of Phoenix and the local freeway is cut below ground level. The only way to assure coverage to mobile phone users taking that low road was to put up a tower-mounted monopole antenna on church property.

The church agreed to the monopole. The church's neighbors didn't. Since the church was undergoing a major renovation and expansion, it was suggested antennas be incorporated into the new design.

Working with the zoning manager of U.S. West Cellular, architects drew up a 110 foot bell tower with fiberglass crosses to conceal the Celwave whip antennas chosen as replacements for the unwanted monopole.

The result was more than satisfactory to all concerned, and today the only holes in the freeway are minor potholes. Say hallelujah.

Celwave has designed and equipped antenna systems to meet all kinds of needs all over the world. Sometime soon, we could do the same for you.

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Let's talk about your future.

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Introduction to Cavities

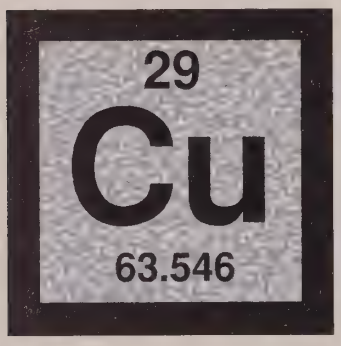
How to Choose One

Cavity resonators have been used in the RF industry for more than thirty years. They come in a variety of shapes and sizes but the basic theory is essentially common to all.

A cavity will resonate when the electrical length of its radiating elements is an odd multiple of a quarter-wavelength. The radiating element, or probe, is adjusted by moving the tuning rod in or out of the cavity. What distinguishes a top-quality cavity or filter from just an average filter?

Materials

Copper is preferred because of its excellent electrical and thermal properties. Additionally, many cavities are silver plated internally to improve their selectivity. The copper and silver avoids many of the chemical poisoning or deterioration problems that can occur in cavities constructed of silver plated aluminum or other metals.



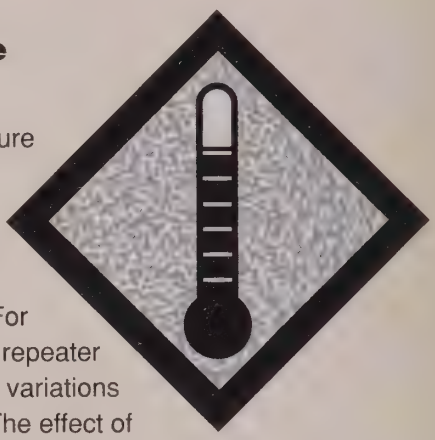
Good cavity compensation designs incorporate materials with low thermal expansion coefficients such as: copper, brass berrilyum and Invar™.

Compatibility of the metals used will determine the likelihood of galvanic or electrolytic action which could compromise long term filter performance.

Construction

The cavities used in land mobile systems are almost without exception made of metals. Since these metals all tend to increase their dimensions with an increase in temperature, and since one or more of the physical dimensions of the cavity controls its resonant frequency, it follows that heating of the cavity will cause a change in its resonant frequency. To the radio user this means degraded performance as the cavity will no longer provide maximum isolation or minimum insertion loss.

More About Temperature Variation



Ambient temperature variation is the variation of the temperature in the vicinity of the cavity and radio. For cavities in remote repeater installations these variations can be extreme. The effect of energy losses (heat dissipation) in all the equipment and in the cavity itself tends to raise the operating temperature slightly above prevailing room temperature, even in temperature controlled rooms.

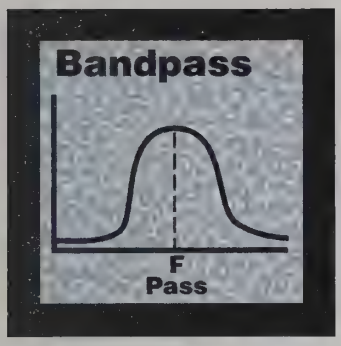
This brings us to the second major cause of temperature variation: heating caused by power dissipation. The cavities used are not lossless devices and the dissipation of power within them gives rise to localized heating within the cavity structure and an increase in the local ambient temperature. The frequency changes caused by localized heating through transmitter power and ambient temperature variation are additive.

How We Minimize Frequency Drift

Years of heat transfer and thermal expansion research has provided Celwave with a superior temperature compensation mechanism. Our cavities use threaded Invar™ rod in their tuning mechanism. Invar™'s very low coefficient of expansion maintains a cavity's tuning over a wide temperature differential when used in conjunction with the cavity's compensation tower. Celwave cavities maintain their electrical specifications integrity over the -40°F to +140°F temperature range.

Bandpass

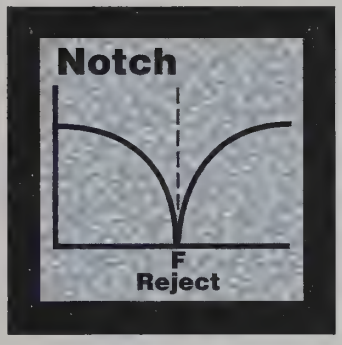
This type of cavity allows a band of frequencies to



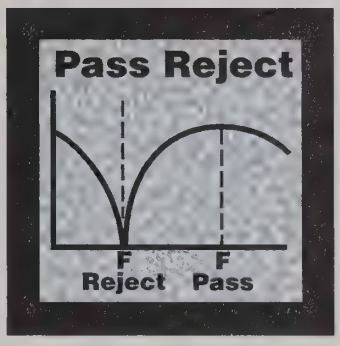
pass with minimum loss while frequencies above and below the band are steeply attenuated. These cavities are used quite often to suppress transmitter side-band noise.

Notch

A notch cavity has the same basic mechanical configuration as a bandpass cavity. It is sometimes referred to as a reject or trap filter because it "traps" the undesired frequency and passes all others. The response curve is the inverse of a bandpass filter.



Pass Reject



Another common type of resonant cavity is the Pass Reject or Pass Notch cavity. This is a combination of the bandpass and notch cavities. These filters are used where the interfering frequency is very close to the desired frequency.

Band Pass Cavities

30-512 MHz

PD644*	30-39 MHz
PD645*	39-50 MHz
PD1185*	66-88 MHz
PD1186*	136-174 MHz
PD1187*	406-512 MHz

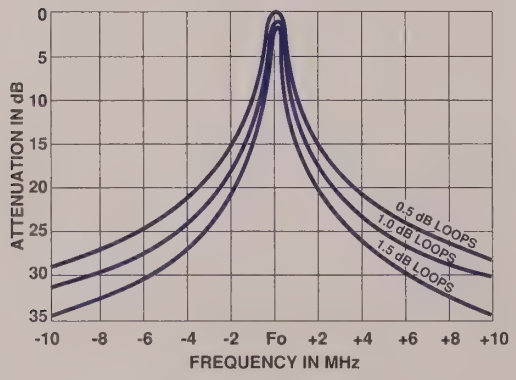
***Exact frequency and insertion loss must be specified.**

The PD644 and PD645 are low band 12-inch diameter cavity resonators for high selectivity applications. Capacity tuned, these TEM mode units employ capacitive probe coupling for easy field adjustment of insertion loss. Differential expansion of inner and outer conductor materials is utilized to temperature compensate the units from -40° to +160°F.

The PD1185, PD1186 and PD1187 are also designed for high selectivity applications. They are 12-inch diameter cavity, standard coaxial resonators with the PD1185 and PD1186 operating as quarter wave devices and PD1187 operating as a three quarter wave device. Adjustable loops are standard to provide adjustment of isolation and insertion loss. The cavities are temperature compensated and are available as single units or in multiple cavity assemblies of two or more.

- **High selectivity** — Provides optimum attenuation of adjacent channels or interfering RF.
- **Temperature compensated** — Assures frequency stability across operating temperature range.

PD1187 RESPONSE CURVE (Typical)
(406-512 MHz)



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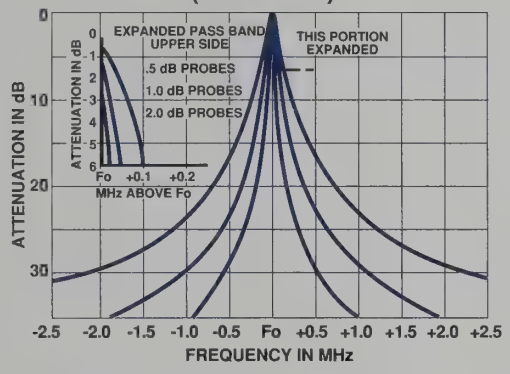
Band Pass Cavities

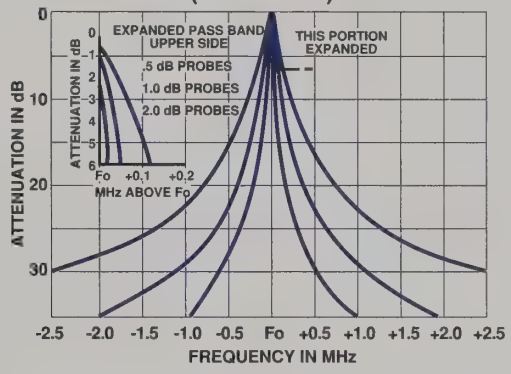
ELECTRICAL SPECIFICATIONS	PD644	PD645	PD1185	PD1186	PD1187
Frequency Range - MHz	30-39	39-50	66-88	136-174	406-512
Continuous Power Input - Watts					
0.5 dB Insertion Loss	350	350	350	1500	500
1.0 dB Insertion Loss	125	125	180	750	350
1.5 dB Insertion Loss	—	—	120	500	175
2.0 dB Insertion Loss	50	50	—	—	—
Insertion Loss - dB	0.5 to 2.0	0.5 to 2.0	0.5 to 1.5	0.5 to 1.5	0.5 to 1.5
Maximum VSWR	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1
Impedence - Ohms	50	50	50	50	50
Connector Type	N-female	N-female	N-female	N-female	N-female
Temperature Range - °F (°C)			-40 to +160 (-40 to +71)		

MECHANICAL SPECIFICATIONS	PD644	PD645	PD1185	PD1186	PD1187
Outer Conductor Material	5052 Aluminum	5052 Aluminum	5052 Aluminum	5052 Aluminum	5052 Aluminum
Inner Conductor Material	Copper	Copper	Copper	Copper	Copper
Cavity Diameter - in. (mm)	12 (305)	12 (305)	12 (305)	12 (305)	12 (305)
Maximum Lengths - in. (mm)	89.5 (2273)	72 (1929)	62 (1575)	36 (914)	36 (914)
Weight - lbs. (kg)	40 (18)	36 (16.3)	32 (14.5)	22 (10)	22 (10)

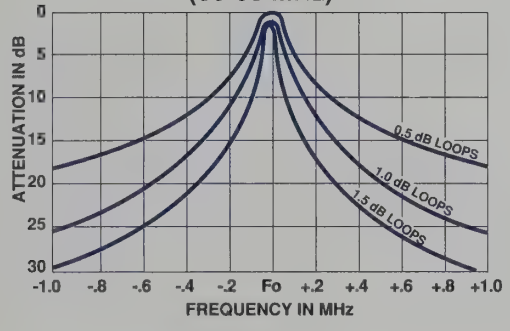
PD644 RESPONSE CURVE (Typical)
(30-39 MHz)



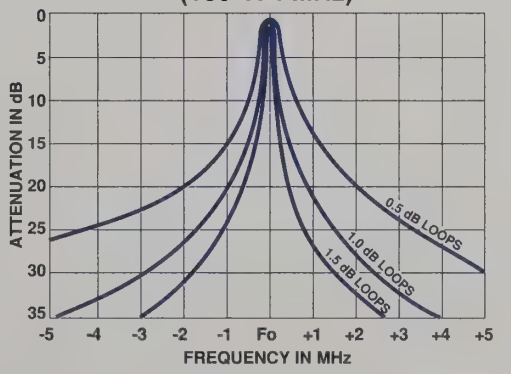
PD645 RESPONSE CURVE (Typical)
(39-50 MHz)



PD1185 RESPONSE CURVE (Typical)
(66-88 MHz)



PD1186 RESPONSE CURVE (Typical)
(136-174 MHz)



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High-Q Band Pass Cavities

148-512 MHz

PD5013-B*	148-174 MHz
PD5013-E*	275-300 MHz
PD5013-A*	440-512 MHz

***Exact frequency and insertion loss must be specified.**

The high selectivity of these all copper, eight inch cavities excel, in applications with narrow frequency separation requiring greater selectivity than achievable with a six inch diameter cavity. The PD5013 is available in single or cascaded (multiple) cavity assemblies of two, three or more.

Double temperature compensation of these cavities provides frequency stability from $^{-}40°$ to $^{+}160°$F. All cavities are supplied with adjustable loops for qualified field adjustment.

The PD5013E is a quarter-wave resonator which is designed to cover the 275-300 MHz portion of the spectrum. Nominal insertion loss is 1.5 dB but other insertion loss values can be supplied on request. At 1.5 dB insertion loss the operating Q-value is 1420.

Contact our Customer Service Department for more information on cascading and mounting.

- **High selectivity** — Provides maximum attenuation of adjacent channels.
- **Temperature compensated** — Frequency stability across operating temperature range.

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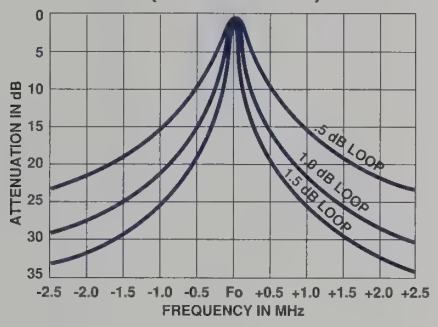
High-Q Band Pass Cavities

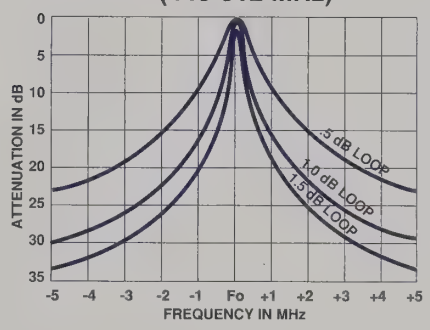
ELECTRICAL SPECIFICATIONS	PD5013-B	PD5013-E	PD5013-A
Frequency Range - MHz	148-174	275-300	440-512
Continuous Power Input - Watts			
0.5 dB Insertion Loss	350	—	350
1.0 dB Insertion Loss	200	—	200
1.5 dB Insertion Loss	125	125	125
Insertion Loss - dB	Dependent upon power requirements	1.5	Dependent upon power requirements
VSWR at Resonance - (min.)	1.3:1	1.3:1	1.3:1
Impedance - Ohms	50	50	50
QL with 1.5 dB Loops	1300	1420 (typical)	1900
Connectors	N-female	N-female	N-female
Temperature Range - °F (°C)	$^{-}$40 to $^{+}$160 ($^{-}$40 to $^{+}$71)	$^{-}$40 to $^{+}$160 ($^{-}$40 to $^{+}$71)	$^{-}$40 to $^{+}$160 ($^{-}$40 to $^{+}$71)

MECHANICAL SPECIFICATIONS	PD5013-B	PD5013-E	PD5013-A
Cavity Diameter - in. (mm)	8-5/32 (207)	8 (203)	8-5/32 (207)
Maximum Length - in. (mm)	35 (889)	20 (508)	35 (889)
Weight - lbs. (kg)	10.5 (4.76)	6 (2.7)	10.5 (4.76)

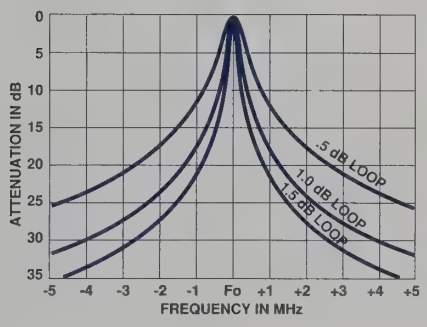
PD5013-B RESPONSE CURVE (Typical)
(148-174 MHz)



PD5013-A RESPONSE CURVE (Typical)
(440-512 MHz)



PD5013-E RESPONSE CURVE (Typical)
(275-300 MHz)



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Band Pass Cavities

66-960 MHz

PD500*	66-960 MHz
PD5090*	136-174 MHz

***Exact frequencies and insertion loss must be specified; see Ordering Information below.**

The PD500 all copper 6 inch diameter quarter-wave cavity resonator provides the selectivity needed to help alleviate the problems created by spectrum congestion. It is available in single or in multiple cavity assemblies of two, three or more units. Selectivity curves given are for a single cavity in the 66-88, 136-174, 406-512, and the 806-960 MHz bands. The selectivity of a two or three cavity assembly may be estimated by multiplying the attenuation values in dB given on these curves, by the number of cavities used. Temperature compensation of these cavities provides frequency stability over the temperature range $^{-}40°F$ to $^{+}160°F$. All PD500 cavities are supplied with adjustable loops for qualified field adjustment of insertion loss and selectivity.

PD5090 is a new improved version of the PD500-1 allowing field replacement of the coupling loops to convert from band pass to pass reject style. *Order PD5132 for reject loop assembly only.*

- **High selectivity** — Minimizes interference from adjacent systems.
- **Temperature compensated** — Assures frequency stability.
- **Adjustable loops** — Facilitates field adjustment.
- **Replaceable coupling loops** — Allows easy field conversion from band pass to band reject.

Ordering Information

Item Number	Frequency Range - MHz
PD500-0	66-88*
PD500-0S	88-118*
PD500-1S	118-136*
PD500-2	200-300*
PD500-3	300-406*
PD500-4	406-512*
PD500-8	806-960*
PD5090-1-1	136-150*
PD5090-1-2	150-174*

***Exact frequencies and insertion loss must be specified.**

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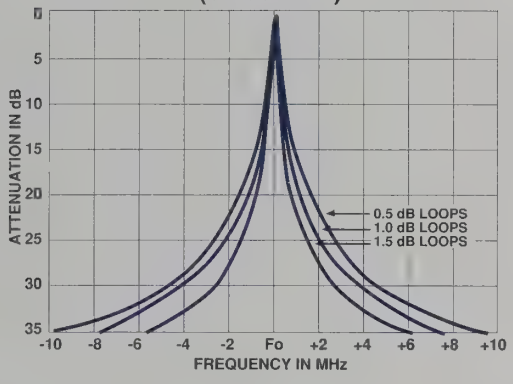
Band Pass Cavities

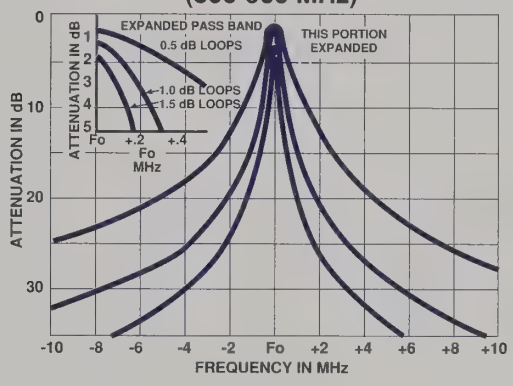
ELECTRICAL SPECIFICATIONS	PD500-0	PD500-0S	PD500-1S	PD5090	PD500-2	PD500-3	PD500-4	PD500-8
Frequency Range - MHz	66-88	88-118	118-136	136-174	200-300	300-406	406-512	806-960
Continuous Power Input - Watts								
0.5 dB Insertion Loss	350	350	350	350	300	300	300	250
1.0 dB Insertion Loss	180	180	180	180	150	150	150	150
1.5 dB Insertion Loss	120	120	120	120	100	100	100	100
Insertion Loss - dB	0.5 dB, 1.0 dB or 1.5 dB, Dependent Upon Power Input Requirements							
Maximum VSWR	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1
Impedance - Ohms	50	50	50	50	50	50	50	50
QL With 1.5 Loops Typical	680	870	920	950	1050	1150	1300	1700
Connector	N-female All Models							
Temperature Range - °F (°C)	$^{-}$40 to $^{+}$160 ($^{-}$40 to $^{+}$71) All Models							

MECHANICAL SPECIFICATIONS	PD500-0	PD500-0S	PD500-1S	PD5090	PD500-2	PD500-3	PD500-4	PD500-8
Cavity Diameter - in. (mm)	6 (152.4)	6 (152.4)	6 (152.4)	6 (152.4)	6 (152.4)	6 (152.4)	6 (152.4)	6 (152.4)
Maximum Length - in. (mm)	70 (1778)	63 (1600)	40 (1016)	35 (889)	27 (178)	20.4 (518)	15 (381)	11 (279)
Weight - lbs. (kg)	15 (6.8)	13.5 (6.12)	9.7 (4.41)	8.5 (3.9)	6.56 (2.97)	5.4 (2.45)	4.9 (2.2)	3.8 (1.72)

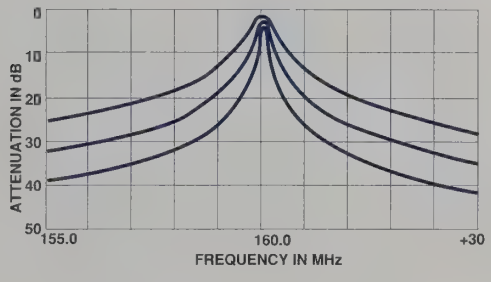
PD500-0 RESPONSE CURVE (Typical)
(66-88 MHz)



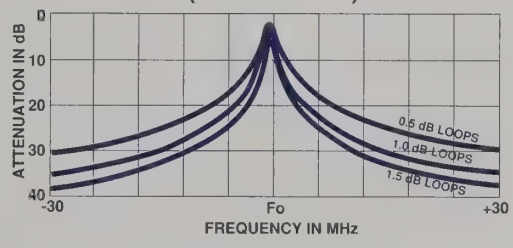
PD500-8 RESPONSE CURVE (Typical)
(806-960 MHz)



PD5090-1-2 RESPONSE CURVE (Typical)
(150-174 MHz)



PD500-4 RESPONSE CURVE (Typical)
(406-512 MHz)



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Pass Reject Cavity

66-960 MHz

PD505*	66-88, 136-174, 406-512 MHz
PD5091*	136-174 MHz
PD695*	406-512 MHz
PD1155*	406-512 MHz
PD895*	806-960 MHz

***Exact pass and reject frequencies must be specified.**

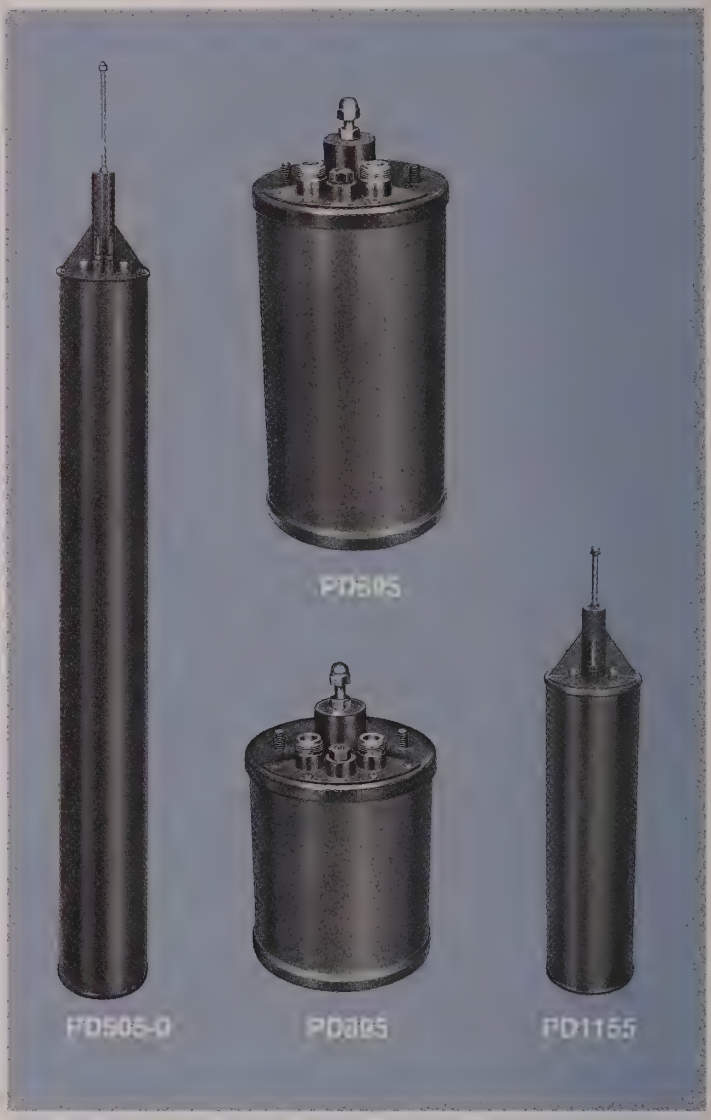
These Celwave Pass Reject Dual Notch Resonators are designed to pass one frequency and reject another. They provide more attenuation than our band pass type cavities. The response curves provided, detail the sharp slope of the reject side, typical of these cavities. These units can be tuned to reject frequencies either above or below the pass frequency and are temperature compensated to insure stability over an operating range from $^{-}40°$ to $^{+}160°F$.

The PD505 cavities are quarter-wave resonators, covering three distinct frequency ranges. PD5091 is a new improved version of the PD505-1 allowing field replacement of the coupling loops to convert from pass reject to band pass style. *Order PD5131 for band pass loop assembly only.*

Like the PD895, the PD695 quarter-wave resonator is only four inches in diameter. It conserves space and expense when power handling requirements do not exceed 250 Watts.

The PD1155 three-quarter wave coaxial resonator provides the highest reject-attenuation in the UHF frequency range. Maximum power handling is rated at 350 Watts.

- **High attenuation** — Minimizes interference from adjacent frequencies.
- **Temperature compensated** — Assures frequency stability.



Ordering Information

Item Number	Frequency Range - MHz
PD505-0	66-88*
PD505-4	406-512*
PD5091-1-1	136-150*
PD5091-1-2	150-174*
PD695	406-512*
PD1155	406-512*
PD895	806-960*

***Exact pass and reject frequencies must be specified.**

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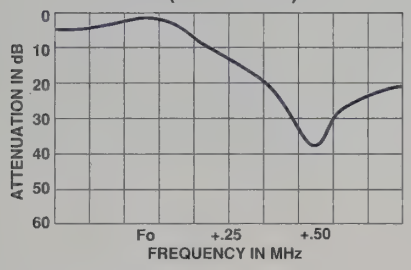
Pass Reject Cavity

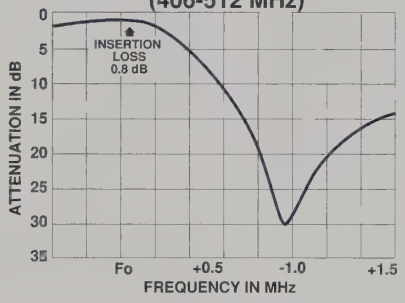
ELECTRICAL SPECIFICATIONS	PD505-0	PD5091	PD505-4	PD695	PD1155	PD895
Frequency Range - MHz	66-88	136-174	406-512	406-512	406-512	806-960
Continuous Power Input - Watts	400	400	400	250	350	100
Insertion Loss - dB	.3	.3 .8	.3 .8	.3 .8	.6 .8	.5
Reject Attenuation - dB	27	27 24	27 24	24 24	30 24	30
Frequency Spacing Min. - MHz	.5	.5 .25	2 1	2 1	1 .5	3.6
Maximum VSWR	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1
Impedance - Ohms	50	50	50	50	50	50
Connector	N-female	N-female	N-female	N-female	N-female	N-female
Temperature °F (°C)			-40 to +160 (-40 to +71)			

MECHANICAL SPECIFICATIONS	PD505-0	PD5091	PD505-4	PD695	PD1155	PD895
Maximum Dimensions Diameter - in. (mm)	6 (152)	6 (152)	6 (152)	4 (101)	6 (152)	4 (101)
Length - in. (mm)	70 (1778)	35 (889)	15 (381)	13 (330)	35 (889)	10 (254)
Weight - lbs. (kg)	15 (6.8)	9 (4.1)	6 (2.7)	4 (1.8)	9 (4.1)	3-1/2 (1.65)

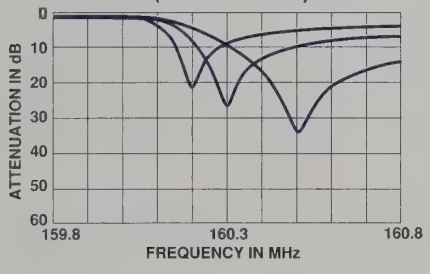
PD505-0 RESPONSE CURVE (Typical)
0.50 MHz SPACING
(66-88 MHz)



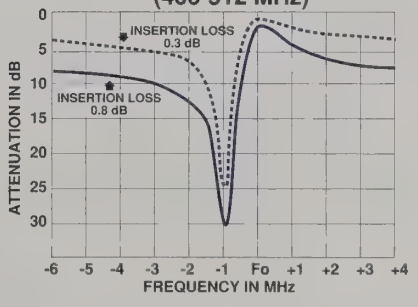
PD505-4 RESPONSE CURVE (Typical)
1 MHz SPACING
(406-512 MHz)



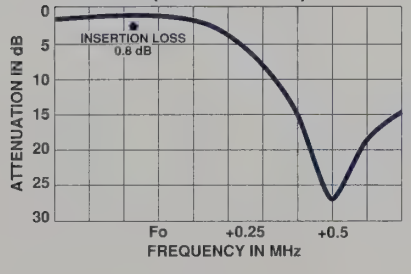
PD5091-1-2 RESPONSE CURVE (Typical)
.25 MHz SPACING
(150-174 MHz)



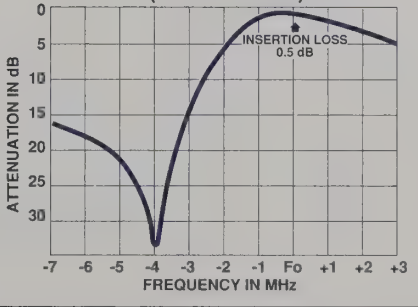
PD695 RESPONSE CURVE (Typical)
1 MHz SPACING
(406-512 MHz)



PD1155 RESPONSE CURVE (Typical)
0.5 MHz SPACING
(406-512 MHz)



PD895 RESPONSE CURVE (Typical)
3.6 MHz SPACING
(806-896 MHz)



Notch Cavities

136-512 MHz

PD1147*	136-174 MHz
PD1148*	406-512 MHz
PD1153*	406-512 MHz

***Notch frequencies must be specified.**

These filter devices are designed to reject one narrow band of frequencies while passing all others in the operating band. They are especially useful in eliminating adjacent frequency "splash over" or interference from a strong proximity signal. They are available singly or in multiple cavity assemblies of two, three or more units to increase reject attenuation.

Copper construction insures maximum selectivity for these cavities. Each filter is temperature compensated to insure stability from ⁻40° to ⁺160°F.

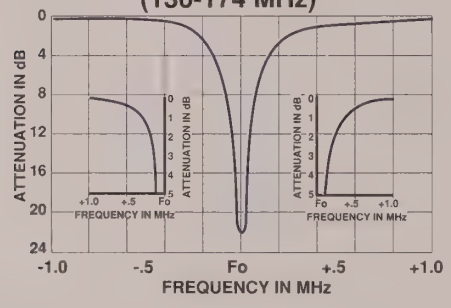
- **Temperature compensated** — Insures frequency stability in operation.
- **Copper construction** — Maximum selectivity.

ELECTRICAL SPECIFICATIONS	PD1147	PD1148	PD1153
Frequency Range - MHz	136-174	406-512	406-512
Continuous Power Input - Watts	400	350	350
Insertion Loss - dB	0.5	0.5	0.5
Reject Attenuation - dB	20	15	17
Frequency Spacing*, Min. - MHz	1.25	2.5	2.0
Maximum VSWR	1.5:1	1.5:1	1.5:1
Impedance - Ohms	50	50	50
Connector Type		N-female	
Temperature Range - °F (°C)		⁻40 to ⁺160 (⁻40 to ⁺71)	

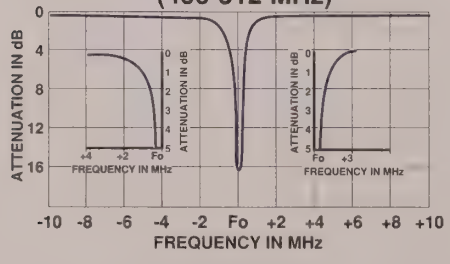
*Units can be supplied for closer spacing on either one side or the other by asymmetric tuning.

MECHANICAL SPECIFICATIONS	PD1147	PD1148	PD1153
Maximum Diameter - in. (mm)	6 (152.4)	6 (152.4)	6 (152.4)
Length - in (mm)	35 (889)	15 (381)	35 (889)
Weight - lbs. (kg)	9.0 (4.1)	6.0 (2.7)	9.0 (4.1)

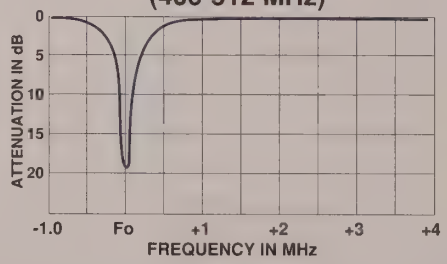
PD1147 RESPONSE CURVES (Typical) (136-174 MHz)



PD1148 RESPONSE CURVES (Typical) (406-512 MHz)



PD1153 RESPONSE CURVE (Typical) (406-512 MHz)



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210	Combline Bandpass Duplexers 806-960 MHz
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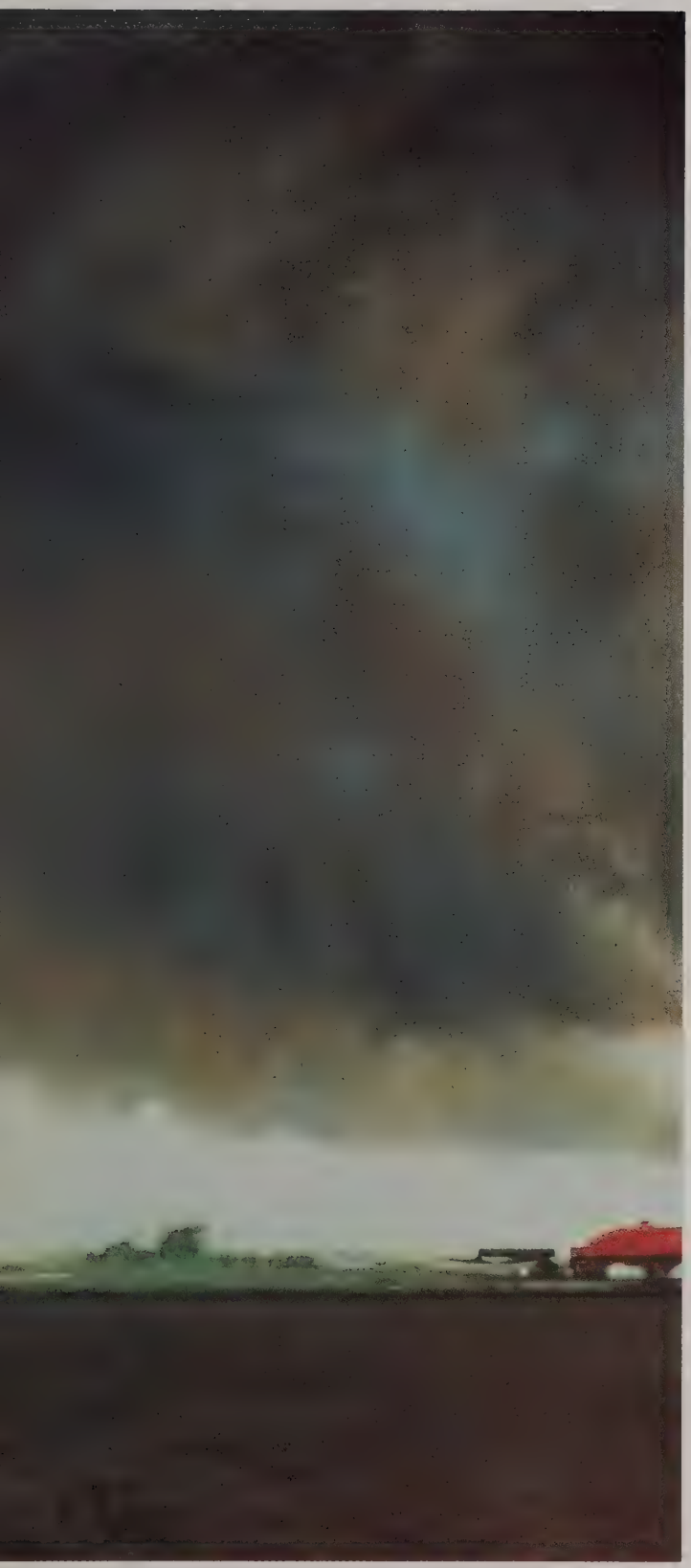
219-220	Band Pass Filters 406-960 MHz
221-222	UHF Receive Filters 450-470 MHz
223-224	Compact Preselectors 66-512 MHz

"The windows went first, then the whole house ripped apart."



The day after twin tornadoes roared through Grand Island, Nebraska, no one could say how many people escaped being killed or injured.

They'd been warned the twisters were coming.

When the 381 radio stations of the National Weather Service aren't alerting people some form of disaster's on the way, they're keeping them up to the minute on - what else - the weather.

It's America's largest FM radio network. Its danger signal can turn on a radio that's turned off. It can reach 90% of the population with all the weather news they need to know and does so twenty four hours a day.

Farmers, fishermen, truckers, railroads, campers and travelers depend on it. So does a lady on the Maine coast who wants to know when the time is right to set out her spring seedlings.

Every one of its 1000 Watt stations uses one of our antennas.

Celwave has designed and equipped antenna systems to meet all kinds of needs all over the world. Sometime soon, we could do the same for you.

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Let's talk about your future.

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Introduction to Duplexers

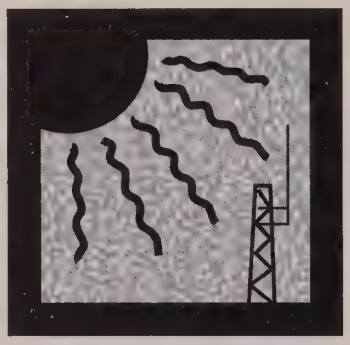
How They're Built

Duplexers used in land mobile radio systems are almost without exception constructed of metals. Since these metals all tend to increase their dimensions with an increase in temperature, and since one or more of the physical dimensions of the cavity controls its resonant frequency, it follows that heating of the cavity or physical stressing of its parts will cause a change in its resonant frequency. To the radio user this means degraded performance as the duplexer will no longer provide maximum isolation. The key to superior duplexer construction then, is to identify the causes of temperature variation and to minimize their effects.

More About Temperature Variation

Temperature variation is the variation of the temperature in the vicinity of the duplexer and radio. For mobile duplexers or those used in remote repeater installations, these temperature variations can be extreme. The effect of energy losses (heat dissipation) in all the equipment in the vicinity of base station duplexers as well as energy losses in the duplexer itself tends to raise the operating temperature slightly above prevailing room temperature, even in temperature controlled rooms.

The second major cause of temperature variation is heating caused by power dissipation. Duplexers are not lossless devices and the dissipation of power within them gives rise to localized heating within the cavity structure and an increase in the local ambient temperature. The frequency changes caused by localized heating through transmitter power and ambient temperature variation are additive.



How We Minimize Frequency Drift

Years of heat transfer and thermal expansion research has provided Celwave with a superior temperature compensated mechanism which minimizes frequency drift. Our base station duplexers use threaded Invar® rod in their tuning mechanism. Invar's very low coefficient of expansion maintains a cavity's tuning over a wide temperature differential when used in conjunction with the cavity's compensation tower.

All Mobile duplexers incorporate materials of similar expansion constant, using extruded cavities, semi-rigid solid shield intercabling and through temperature cycling. The temperature cycling assures that our duplexers will remain precisely tuned when temperature changes contract/expand materials. Celwave duplexers maintain their electrical specifications integrity over the $^{-}22°F$ to $^{+}140°F$ temperature range.

How We Minimize Insertion Loss

Lower insertion loss improves the effective radiated power of your radio system's main components. Celwave utilizes materials and finishes to reduce duplexer insertion loss. Copper sheathed Teflon® dielectric semi-rigid intercabling (compact duplexers,) RG214A/U double-shielded coaxial cable (base duplexers), Teflon® dielectric supports, silver-plated resonators, and other construction features are employed to reduce power loss.

Design Flexibility

Many of the electrical designs shown in the following section are available in customized mechanical configurations. Consult our Customer Service Department for non-standard connectors, mounting variations or special size requirements.

Life's not easy for a duplexer.

Some occupy repeater stations that are often miles from nowhere and seldom have visitors. Others spend their lives as part of a mobile unit in the trunk of a car.

CELWAVE prepares them for their respective fates by building them tough and treating them tougher.

We pull all production units off the line and pop them into an environmental chamber. After we freeze them at -40°F, we bake them at +140°F. Then we check for changes in resonant frequencies caused by

contraction or expansion of the cavities to ensure stability in operation.

Such procedures are typical of the care and craftsmanship that go into all CELWAVE products: antennas, cavity devices, transmitter combiners, receiver multicouplers...and duplexers.

By using only the most suitable materials, construction with meticulous attention to detail and testing with real needs in mind, we prepare CELWAVE equipment for rough times.

So its users can communicate with ease.

CELWAVE

DIVISION OF RADIO FREQUENCY SYSTEMS

Let's talk about your future.

Dual Notch Duplexers

66-225 MHz

PD506-0*	66-88 MHz
PD506-1*	136-174 MHz
PD506-2*	220-225 MHz

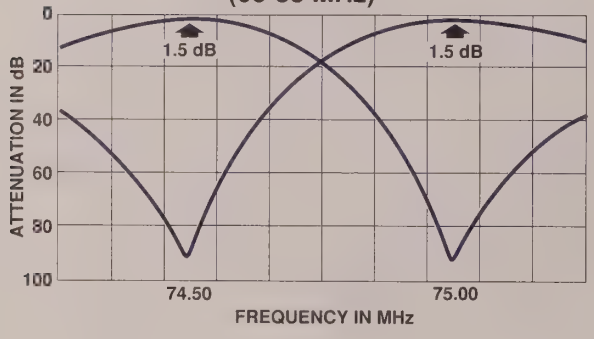
***Exact Tx and Rx frequencies must be specified.**

The PD506 series duplexers use two dual notch pass-reject cavities in each channel which incorporates a unique loop structure to minimize the number of cable-to-connector joints and provide the simplest possible harnessing arrangement.

These units have a pseudo bandpass characteristic which is particularly noticeable at wider frequency spacings. The result is high Tx-Rx isolation at frequencies between and adjacent to operating frequencies. Isolation characteristic can be enhanced at close spacings by increasing coupling and therefore insertion loss to greater values. Brackets for mounting on either vertical or horizontal surfaces are supplied.

• **Low loss**	Maximizes system performance.
• **Temperature compensated**	Assures consistent performance across temperature and power range.
• **High isolation**	Minimizes interference.

PD506-0 RESPONSE CURVES (Typical)
.500 MHz SPACING
(66-88 MHz)



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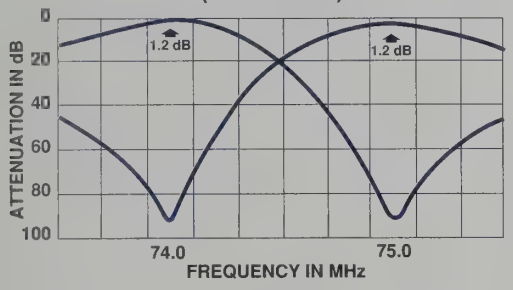
Dual Notch Duplexers

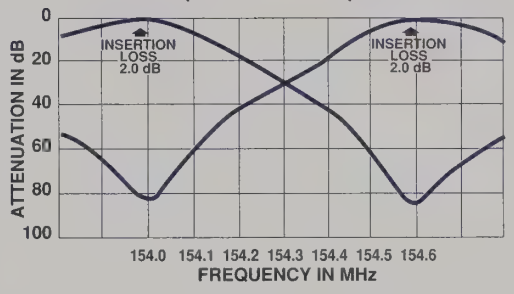
ELECTRICAL SPECIFICATIONS	PD506-0	PD506-0	PD506-1	PD506-1	PD506-2
Frequency Range - MHz	66-88	66-88	136-174	136-174	220-225
Frequency Spacing, Min. - MHz	.500	1	.600	5	1.6
Continuous Power Input - Watts	180	350	180	350	300
Insertion Loss Tx-Ant. - dB	1.5	1.2	2.0	0.8	1.0
Insertion Loss Rx-Ant. - dB	1.5	1.2	2.0	0.8	1.0
Tx Noise Supression at Rx Frequency - dB	80	85	80	85	90
Rx Isolation at Tx Frequency - dB	80	85	80	85	90
VSWR - Max.	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1
Impedence - Ohms	50	50	50	50	50
Connector	N-female	N-female	N-female	N-female	N-female
Temperature Range - °F (°C)			$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60))		

MECHANICAL SPECIFICATIONS	PD506-0	PD506-0	PD506-1	PD506-1	PD506-2
Height - in. (mm)	13 (330)	13 (330)	13 (330)	13 (330)	13 (330)
Width - in. (mm)	13 (330)	13 (330)	13 (330)	13 (330)	13 (330)
Maximum Length - in. (mm)	70 (1778)	70 (1778)	35 (889)	35 (889)	27 (685)
Weight - lbs. (kg)	65 (29.5)	65 (29.5)	45 (20.4)	45 (20.4)	40 (18.1)

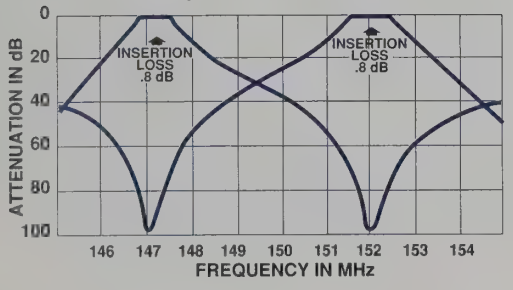
PD506-0 RESPONSE CURVES (Typical)
1 MHz SPACING
(66-88 MHz)



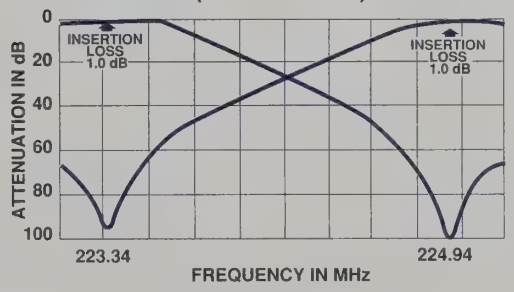
PD506-1 RESPONSE CURVES (Typical)
0.600 MHz SPACING
(136-174 MHz)



PD506-1 RESPONSE CURVES (Typical)
5 MHz SPACING
(136-174 MHz)



PD506-2 RESPONSE CURVES (Typical)
1.6 MHz SPACING
(220-225 MHz)



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Dual Notch Duplexers

66-512 MHz

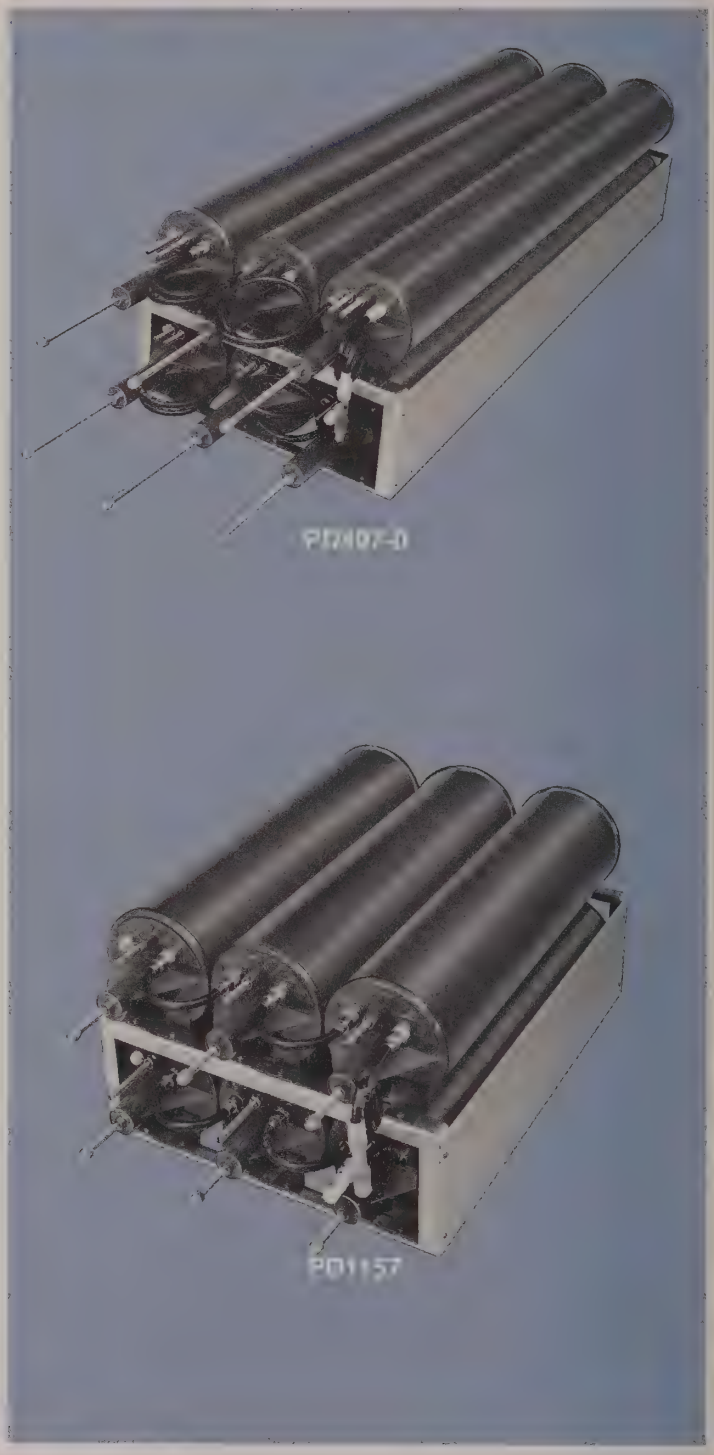
PD497-0*	66-88 MHz
PD497-1*	136-174 MHz
PD1157*	406-512 MHz

***Exact Tx and Rx frequencies must be specified.**

These units incorporate a unique loop structure which provides for a minimum number of cable connector joints and the most simple harnessing arrangement possible. Their dual notch circuitry provides a pseudo band pass characteristic resulting in high Tx-Rx isolation at frequencies between and adjacent to the operating frequencies.

The PD1157 operates in the three quarter-wave mode to allow closer Tx-Rx spacing while maintaining excellent isolation and insertion loss. PD497 units are supplied with brackets for mounting on either vertical or horizontal surfaces.

• **Low loss**	Maximizes system performance.
• **High isolation**	Minimizes interference.
• **Fully temperature compensated**	Assures consistent performance across temperature and power range.



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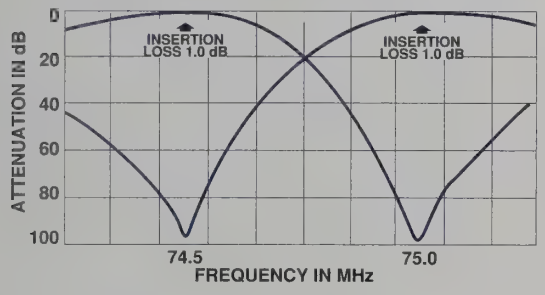
Dual Notch Duplexers

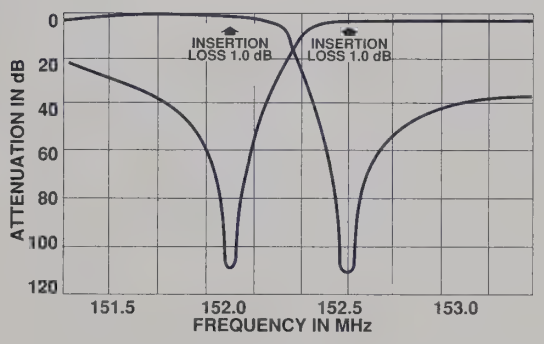
ELECTRICAL SPECIFICATIONS	PD497-0	PD497-1	PD497-1	PD497-1	PD1157
Frequency Range - MHz	66-88	136-174	136-174	136-174	406-512
Frequency Spacing - MHz	.500	.500	.500	2	.500
Continuous Input Power - Watts	350	350	200	350	200
Insertion Loss - dB	1.0	1.0	2.0	1.0	2.2
Insertion Loss Rx - Ant. - dB	1.0	1.0	2.0	1.0	2.2
Tx Noise Suppression at Rx Frequency - dB	100	100	115	120	80
Rx Isolation at Tx Frequency - dB	100	100	115	120	80
VSWR - Max.	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1
Impedance - Ohms	50	50	50	50	50
Connector	N-female	N-female	N-female	N-female	N-female
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)				

MECHANICAL SPECIFICATIONS	PD497-0	PD497-1	PD497-1	PD497-1	PD1157
Cavity Diameter - in. (mm)	6 (152)	6 (152)	6 (152)	6 (152)	6 (152)
Height - in. (mm)	13 (330)	13 (330)	13 (330)	13 (330)	13 (330)
Width - in. (mm)	19-1/4 (489)	19-1/4 (489)	19-1/4 (489)	19-1/4 (489)	19-1/4 (489)
Length - in. (mm)	70 (1778)	35 (889)	35 (889)	35 (889)	35 (889)
Weight - lbs. (kg)	110 (49.5)	60 (27)	60 (27)	60 (27)	60 (27)

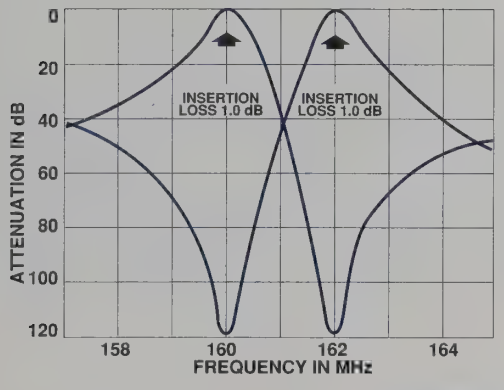
PD497-0 RESPONSE CURVES (Typical)
.500 MHz SPACING
(66-88 MHz)



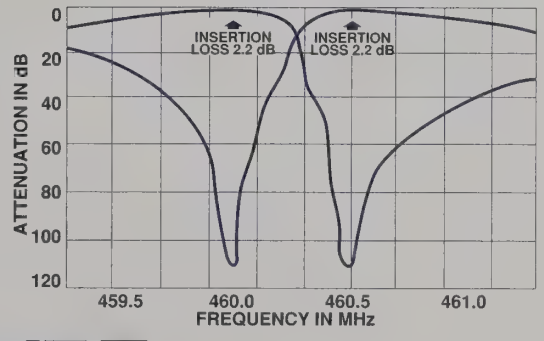
PD497-1 RESPONSE CURVES (Typical)
.500 MHz SPACING
(136-174 MHz)



PD497-1 RESPONSE CURVES (Typical)
2 MHz SPACING
(136-174 MHz)



PD1157 RESPONSE CURVES (Typical)
.500 MHz SPACING
(406-512 MHz)



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Compact Base Station Duplexers

66-512 MHz

PD638*	66-512 MHz
PD5085*	138-174 MHz

***Exact Tx and Rx frequencies must be specified.**

Celwave's PD638 and PD5085 duplexers are ideal for repeater and base station applications where higher input power and compact dimensions are essential. These duplexers are capable of handling up to 150 Watts of continuous input power.

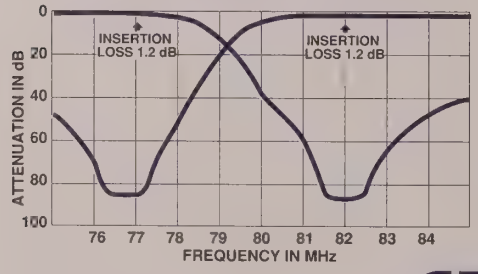
The PD638 Series features include an all brass construction providing exceptional electrical stability and physical durability. Low loss solid shield copper jacketed intercabling also enhance this stability. The PD5085 uses a unique resonator design to reduce the overall length of the duplexer by 50% from standard resonator designs.

- **Low loss** — Maximizes system performance.
- **Compact** — Minimizes use of space.
- **Brass construction** — Maximizes electrical stability.

Ordering Information
(Exact frequencies must be specified.)

Item Number	Frequency Range-MHz
PD638-6-0	66-88
PD638-6-1	150-174
PD638-6-2	220-225
PD638-6-4	406-470
PD638-6-5	470-512
PD638	406-470
PD5085-1	138-150 (3 MHz)
PD5085-2	138-150 (5 MHz)
PD5085-3	150-162 (3 MHz)
PD5085-4	150-162 (5 MHz)
PD5085-5	162-174 (3 MHz)
PD5085-6	162-174 (5 MHz)

PD638-6-0 RESPONSE CURVES (Typical)
5 MHz SPACING (66-88 MHz)



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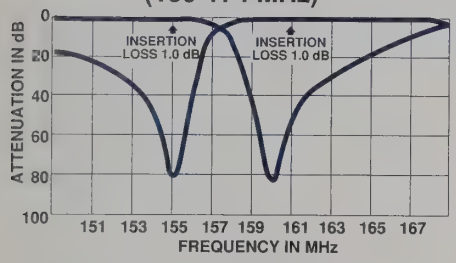
Compact Base Station Duplexers

ELECTRICAL SPECIFICATIONS	PD638-6-0	PD638-6-1	PD638-6-2	PD638-6-4	PD638-6-5	PD638	PD5085
Frequency Range - MHz	66-88	150-174	220-225	406-470	470-512	406-470	138-174
Frequency Spacing - MHz	5 to 10	3 to 5	1.6	5 to 12	3 to 5	5 to 12	3 to 5
Continuous Power Input - Watts	100	150	100	100	65	100	100
Insertion Loss, Tx - Ant. - dB*	1.2	1.2	1.8	1.2	1.7	0.8	1.4 (max.)
Insertion Loss, Tx - Ant. - dB*	1.2	1.2	1.8	1.2	1.7	0.8	1.4 (max.)
Tx Noise Suppression at Rx Frequency - dB*	70	75	75	75	75	60	75
Rx Isolation at Tx Frequency - dB*	70	75	75	75	75	60	75
VSWR - Max.	1.5:1	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1	1.3:1
Impedance - Ohms	50	50	50	50	50	50	50
Temperature Range - °F (°C)	-22 to +140 (-30 to +60)						
Connector	N-female	N-female	N-female	N-female	N-female	N-female	N-female

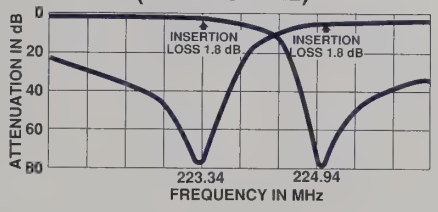
*@ Minimum Frequency Spacing.

MECHANICAL SPECIFICATIONS	PD638-6-0	PD638-6-1	PD638-6-2	PD638-6-4	PD638-6-5	PD638	PD5085
Height - in. (mm)	1-3/4 (44.5)	1-3/4 (44.5)	1-3/4 (44.5)	1-3/4 (44.5)	1-3/4 (44.5)	1-3/4 (44.5)	1-3/4 (44.5)
Width - in. (mm)	9-1/16 (230)	9-1/16 (230)	9-1/16 (230)	9-1/16 (230)	9-1/16 (230)	6-1/32 (153)	8-1/2 (216)
Length - in. (mm)	10-3/4 (273)	22-1/2 (572)	16-1/2 (419)	10-1/4 (206)	10-1/4 (206)	10-1/4 (206)	11 (279)
Weight - lbs. (kg)	7-5/8 (3.5)	13 (59)	11-1/4 (5.1)	6-1/4 (2.8)	6-1/4 (2.8)	4-3/4 (2.1)	4-1/2 (2.1)

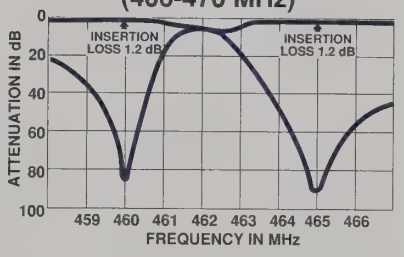
PD638-6-1 RESPONSE CURVES (Typical) 5 MHz SPACING (150-174 MHz)



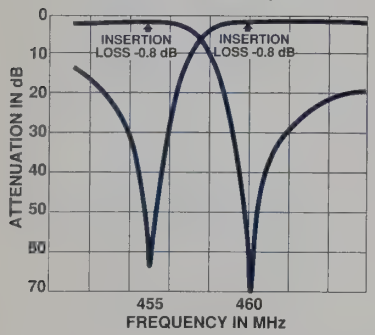
PD638-6-2 RESPONSE CURVES (Typical) 1.6 MHz SPACING (220-225 MHz)



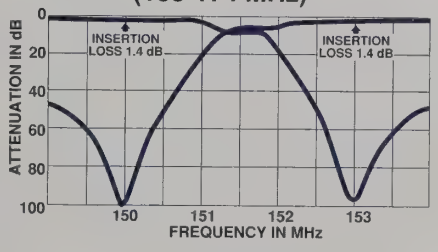
PD638-6-4 RESPONSE CURVES (Typical) 5 MHz SPACING (406-470 MHz)



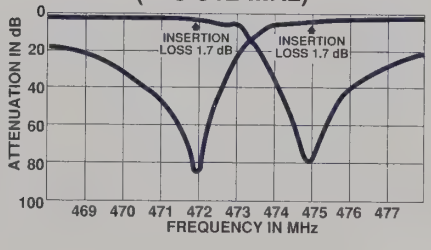
PD638 RESPONSE CURVES (Typical) 5 MHz SPACING (406-470 MHz)



PD5085 RESPONSE CURVES (Typical) 3 MHz SPACING (138-174 MHz)



PD638-6-5 RESPONSE CURVES (Typical) 3 MHz SPACING (470-512 MHz)



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Dual Notch Duplexers

138-225 MHz

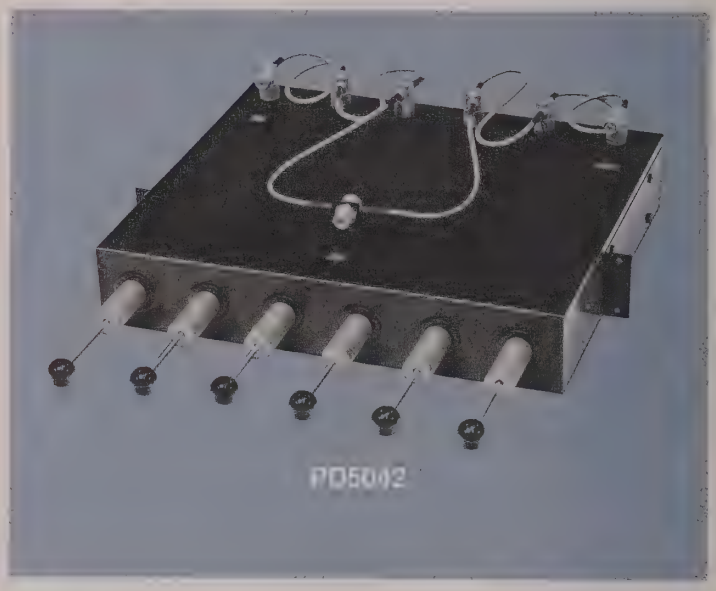
PD5042-1* 138-174 MHz
PD5042-2* 220-225 MHz
***Exact Tx and Rx frequencies must be specified.**

Celwave's PD5042 represents a family of duplexers providing frequency separation as low as 0.5 MHz and requiring less than 5 inches of vertical rack space. Its unique dual pass notch, high isolation design and small size make it ideal for base station applications.

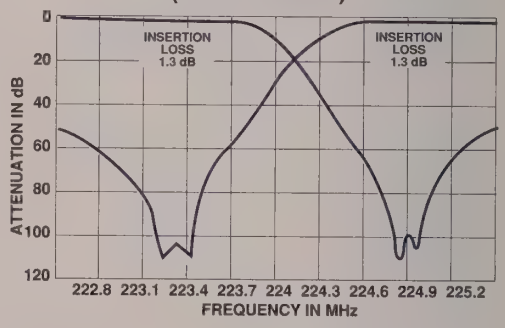
The units feature temperature compensated copper construction and cavities that are intercabled with double shielded Teflon® jacket cable for long term product integrity.

- **High isolation** Minimizes interference.
- **Temperature compensated** Assures consistent performance across temperature and power range.
- **Compact** Minimizes rack space requirements.

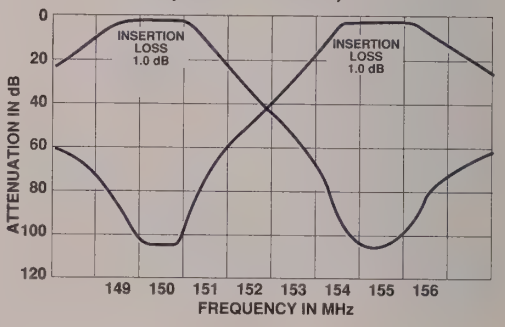
Teflon® is a registered trademark of Du Pont.



PD5042 RESPONSE CURVE (Typical)
1.6 MHz SPACING
(220-225 MHz)



PD5042 RESPONSE CURVE (Typical)
5.0 MHz SPACING
(138-174 MHz)



ELECTRICAL SPECIFICATIONS	PD5042-1		PD5042-2
Frequency Range - MHz	138-174		220-225
Frequency Spacing - MHz	.5 (min.)	≥5.0	1.6
Continuous Power Input - Watts	100	350	100
Insertion Loss Tx-Ant. - dB (max.)	1.8	1.0	1.3
Insertion Loss Rx-Ant. - dB (max.)	1.8	1.0	1.3
Tx Noise Suppression at Rx Frequency - dB	60	90	90
Rx Isolation at Tx Frequency - dB	60	90	90
Maximum VSWR	1.5:1	1.3:1	1.3:1
Impedance - Ohms	50	50	50
Connector Type	N-female		N-female
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		

MECHANICAL SPECIFICATIONS	PD5042-1	PD5042-2
Height - in. (mm)	4-5/8 (118)	4-5/8 (118)
Width - in. (mm)	19 (483)	19 (483)
Length - in. (mm)	22-3/4 (578)	22-3/4 (578)
Weight - lbs. (kg)	22 (10)	22 (10)
Mounts in a standard 19 inch (483 mm) E.I.A. Rack Panel		

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Telemetry Duplexers

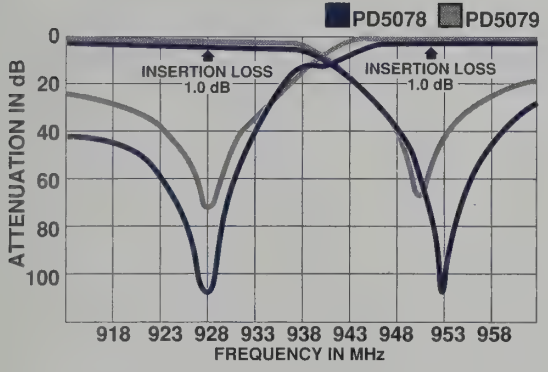
896-960 MHz

PD5078* **6 Cavity**
PD5079* **4 Cavity**
***Exact Tx and Rx frequencies must be specified.**

These Celwave duplexers have been engineered specifically for telemetry system applications. Of four and six cavity design, each features different levels of isolation and outer dimension configuration. These compact, durable duplexers utilize solid shielded copper jacketed intercabling for low loss and are temperature compensated from ⁻22°F to ⁺140°F.

- **High isolation** — Minimizes interference.
- **Low loss** — Maximizes system performance.
- **Temperature compensated** — Ensures consistent performance across temperature range.

PD5078 and PD5079
RESPONSE CURVES (Typical)
24 MHz SPACING (896-960 MHz)



ELECTRICAL SPECIFICATIONS	PD5079 (4 CAVITY)	PD5078 (6 CAVITY)
Frequency Range - MHz	896-960	896-960
Frequency Spacing - MHz	24	24
Continuous Power Input - Watts	50	50
Insertion Loss, Tx - Ant. - dB	1.0	1.0
Insertion Loss, Rx - Ant. - dB	1.0	1.0
Tx Noise Suppression at Rx Frequency - dB	60	80
Rx Isolation at Tx Frequency - dB	60	80
VSWR - Max.	1.5:1	1.5:1
Connector	BNC female	BNC female
Temperature Range - °F (°C)	⁻22 to ⁺140 (⁻30 to ⁺60)	

MECHANICAL SPECIFICATIONS	PD5079 (4 CAVITY)	PD5078 (6 CAVITY)
Height - in. (mm)	1-1/4 (32)	1-1/4 (32)
Width - in. (mm)	4-1/8 (105)	6-1/4 (159)
Length - in. (mm)	6-1/4 (159)	6 (152)
Weight - lbs. (kg)	1.25 (.6)	1.75 (.8)

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

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Miniplexer™ Pass Reject Duplexers

144-174 MHz

PD7340*	**4 Cavity**	144-160 MHz
PD7360*	**6 Cavity**	144-160 MHz
PD7440*	**4 Cavity**	155-174 MHz
PD7460*	**6 Cavity**	155-174 MHz

***Exact Tx and Rx frequencies must be specified.**

With its small size, the Miniplexer solves the space problem in a wide variety of applications including VHF car telephones, vehicular repeaters and repeater base stations. Their design and construction features include solid shield copper jacketed intercabling for low loss and extruded aluminum cavities for durability. All units are field tunable by qualified personnel, rated at 50 Watts and able to maintain rated specifications from $^{-}22°$ to $^{+}140°$F.

- **Compact** — Minimizes space requirements.
- **Extruded aluminum cavities** — Ensures durability.
- **Low loss** — Maximizes system performance.

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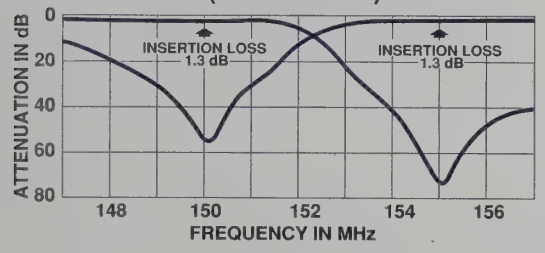
Miniplexer™ Pass Reject Duplexers

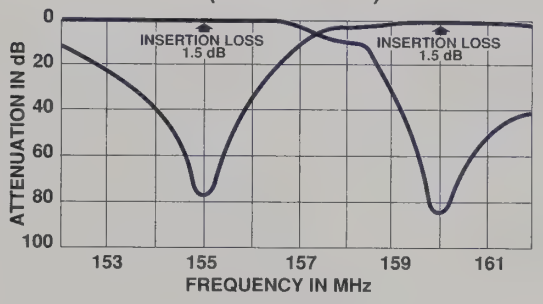
ELECTRICAL SPECIFICATIONS	PD7340	PD7440	PD7360	PD7460
Frequency Range - MHz	144-160	155-174	144-160	155-174
Frequency Spacing (min.) - MHz	4.5	4.5	4.5	4.5
Continuous Power Input - Watts	50	50	50	50
Insertion Loss Tx -Ant. - dB	1.3	1.3	1.5	1.5
Insertion Loss Rx -Ant. - dB	1.3	1.3	1.5	1.5
Tx Noise Supression at Rx Frequency - dB	50	50	70	70
Rx Isolation at Tx Frequency - dB	50	50	70	70
Maximum VSWR (50 Ohms)	1.5:1	1.5:1	1.5:1	1.5:1
Impedence - Ohms	50	50	50	50
Connector Type	BNC-female	BNC-female	BNC-female	BNC-female
Temperature Range - °F (°C)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)

MECHANICAL SPECIFICATIONS	PD7340	PD7440	PD7360	PD7460
Height - in. (mm)	1-1/4 (31.8)	1-1/4 (31.8)	1-1/4 (31.8)	1-1/4 (31.8)
Width - in. (mm)	4-1/8 (105)	4-1/8 (105)	6-3/16 (157)	6-3/16 (157)
Length - in. (mm)	4-3/8 (111)	4-3/8 (111)	4-3/8 (111)	4-3/8 (111)
Weight - lbs. (kg)	1 (.5)	1 (.5)	1-1/2 (0.7)	1-1/2 (0.7)

PD7440 RESPONSE CURVES (Typical)
5 MHz SPACING
(155-174 MHz)

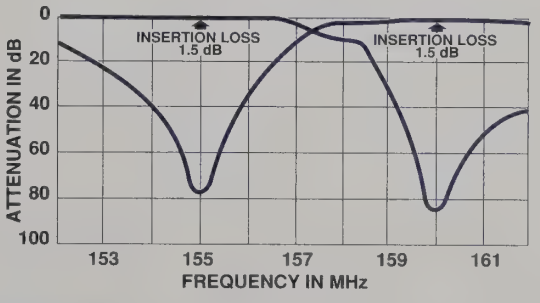


PD7460 RESPONSE CURVES (Typical)
5 MHz SPACING
(155-174 MHz)



PD7340 RESPONSE CURVES (Typical)
4.5 MHz SPACING
(144-160 MHz)

PD7360 RESPONSE CURVES (Typical)
5 MHz SPACING
(144-160 MHz)



CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

VHF Compact Duplexers

144-174 MHz

PD636A* **4 Cavity**
PD636-6A* **6 Cavity**
***Exact Tx and Rx frequencies must be specified.**

Celwave's PD636A uses two capacitively tuned, temperature compensated helical resonators in the receiver channel and two more in the transmit channel. The resonators are housed in a compact 6063-T6 irridited aluminum extrusion that is painted for additional protection.

Our PD636-6A has six resonator cavities to provide additional isolation. Unique construction features include solid shield copper jacket Teflon® inter-cabling for low loss and stability.

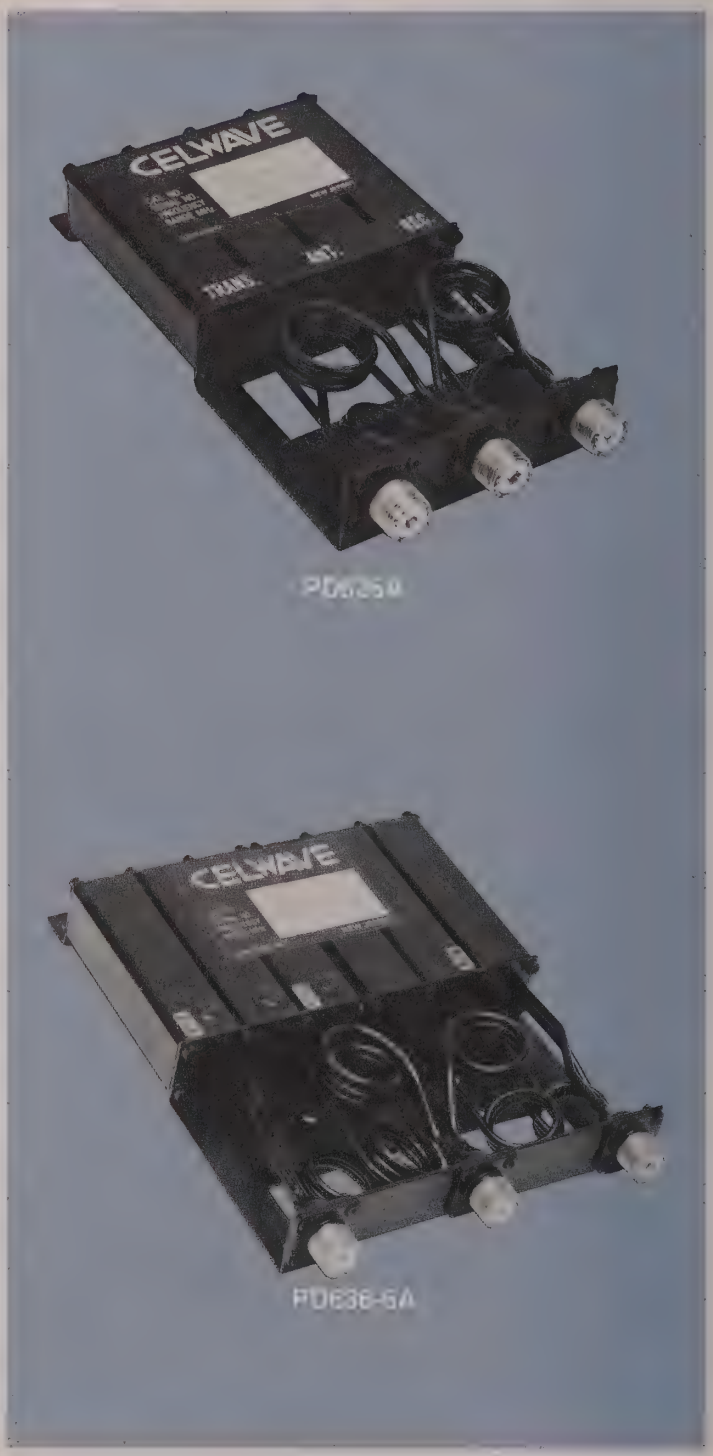
- **Low loss** — Maximizes system performance.
- **High Isolation** — Minimizes interference.
- **Unique construction** — For low loss and system stability.

Teflon® is a registered trademark of Du Pont.

Ordering Information

Item Number	Frequency Range - MHz
636A-1	144-155*
636A-2	155-162*
636A-3	162-174*
636-6A-1	144-155*
636-6A-2	155-162*
636-6A-3	162-174*

***Exact Tx and Rx frequencies must be specified.**



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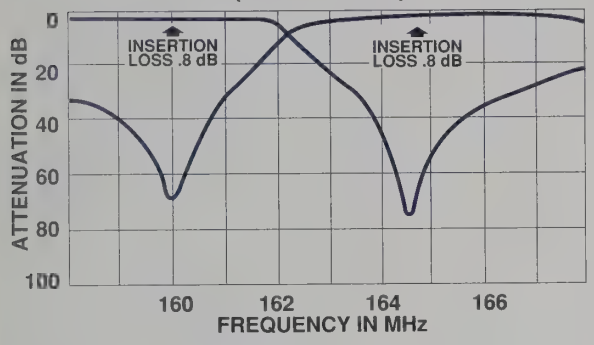
VHF Compact Duplexers

PD636A RESPONSE CURVES (Typical)
4.5 MHz SPACING
(144-174 MHz)



PD636-6A RESPONSE CURVES (Typical)
4.5 MHz SPACING
(144-174 MHz)

ELECTRICAL SPECIFICATIONS	PD636A	PD636-6A
Frequency Range - MHz	144-174	144-174
Frequency Spacing - MHz	4.5	4.5
Continuous Power Input - Watts	50	50
Insertion Loss, Tx - Ant. - dB	0.8	1.2
Insertion Loss, Rx - Ant. - dB	0.8	1.2
Tx Noise Suppression at Rx Frequency - dB	60	80
Rx Isolation at Tx Frequency - dB	60	80
VSWR - Max.	1.5:1	1.5:1
Impedance - Ohms	50	50
Connector	BNC female (Std.) UHF-female or N-female (Optional)	
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	

MECHANICAL SPECIFICATIONS	PD636	PD636-6A
Height - in. (mm)	1-1/4 (31.8)	1-1/4 (31.8)
Width - in. (mm)	4-1/8 (105)	6-1/4 (159)
Length - in. (mm)	8-1/2 (216)	8-1/2 (216)
Weight - lbs. (kg)	2 (0.9)	2.2 (1)

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Miniplexer™ Pass Reject Duplexers

406-470 MHz

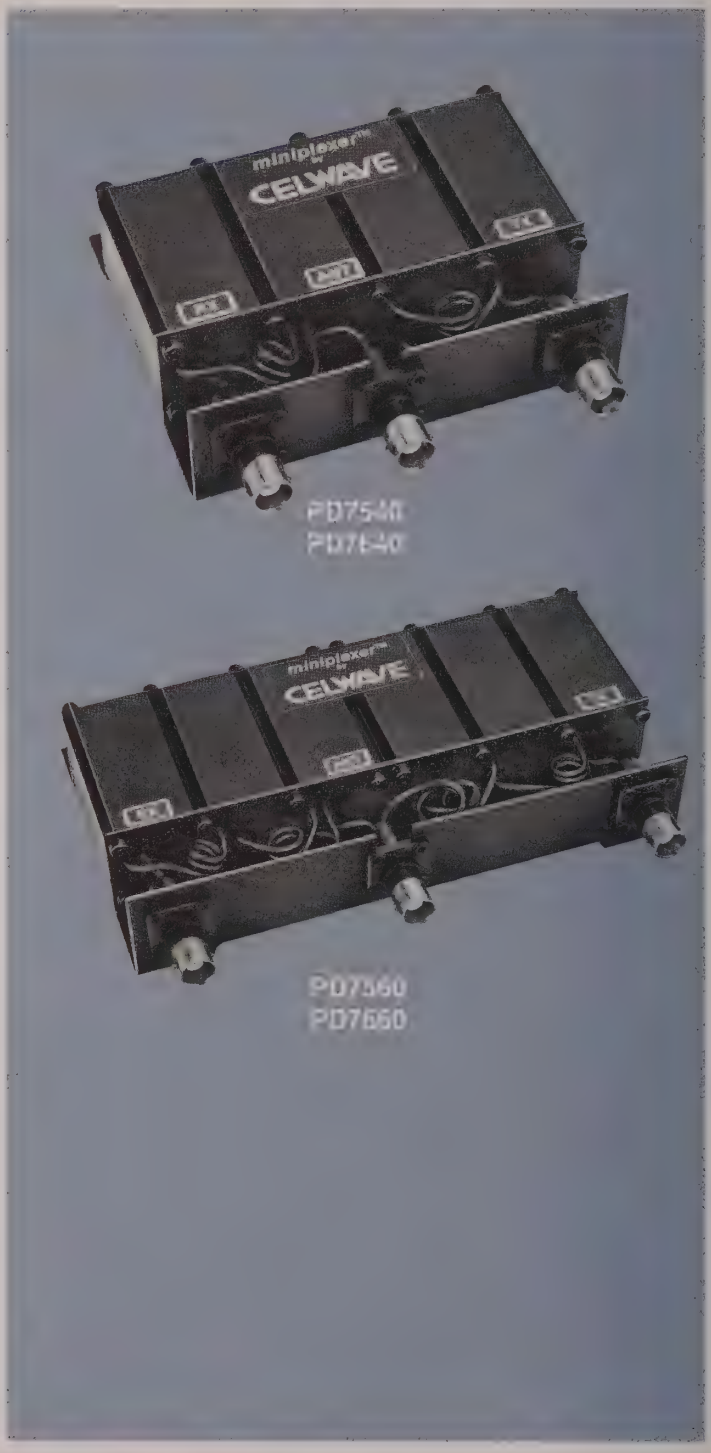
PD7540*	**4 Cavity**	406-440 MHz
PD7560*	**6 Cavity**	406-440 MHz
PD7640*	**4 Cavity**	430-470 MHz
PD7660*	**6 Cavity**	430-470 MHz

***Exact Tx and Rx frequencies must be specified.**

The small size of Celwave's Miniplexers™ solves space problems in a wide variety of applications including car phones, portable and vehicular repeaters and repeater base stations. Their design and construction features include solid shield copper jacketed intercabling for low loss and an extruded aluminum cavity for durability. BNC connectors are standard.

This UHF Duplexer Series is available in four or six cavity versions with two bands, either 5 or 10 MHz spacing and up to 65 dB minimum isolation. All are easiliy field tunable, rated at 50 Watts and maintain rated specifications from -22°F to +140°F.

- **Low loss** — Maximizes system performance.
- **Temperature compensated** — Ensures consistent performance across temperature range.
- **Compact** — Reduces space requirements.
- **High isolation** — Minimizes interference.



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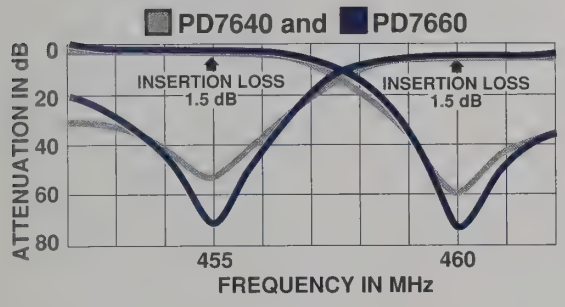
Miniplexer™ Pass Reject Duplexers

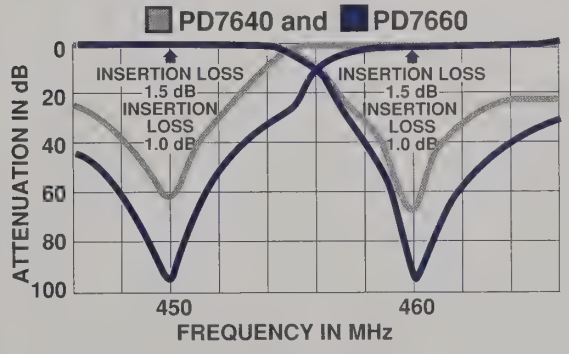
ELECTRICAL SPECIFICATIONS	PD7540 (4 CAVITY)		PD7640 (4 CAVITY)		PD7560 (6 CAVITY)		PD7660 (6 CAVITY)	
Frequency Range - MHz	406-440		430-470		406-440		430-470	
Frequency Spacing - MHz	5	10	5	10	5	10	5	10
Continuous Power Input - Watts	50	50	50	50	50	50	50	50
Insertion Loss Tx - Ant. - dB	1.5	1.5	1.5	1.0	1.5	1.2	1.5	1.2
Insertion Loss Rx - Ant. - dB	1.5	1.0	1.5	1.0	1.5	1.2	1.5	1.2
Tx Noise Suppression at Rx Frequency - dB	50	55	50	55	65	80	65	80
Rx Isolation at Tx Frequency - dB	50	55	50	55	65	80	65	80
Maximum VSWR	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1
Impedance - Ohms	50	50	50	50	50	50	50	50
Connector Type (female)	BNC		BNC		BNC		BNC	
Temperature Range °F (°C)	$^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)							

MECHANICAL SPECIFICATIONS	PD7540 (4 CAVITY)	PD7640 (4 CAVITY)	PD7560 (6 CAVITY)	PD7660 (6 CAVITY)
Height - in. (mm)	1-1/4 (31.8)	1-1/4 (31.8)	1-1/4 (31.8)	1-1/4 (31.8)
Width - in. (mm)	4-1/8 (105)	4-1/8 (105)	6-1/8 (156)	6-1/8 (156)
Length - in. (mm)	4-3/8 (111)	4-3/8 (111)	4-3/8 (111)	4-3/8 (111)
Weight - lbs. (kg)	1 (0.05)	1 (0.05)	1-1/2 (0.07)	1-1/2 (0.07)

RESPONSE CURVE (Typical)
5 MHz SPACING (430-470 MHz)



RESPONSE CURVE (Typical)
10 MHz SPACING (430-470 MHz)



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UHF Duplexers

355-512 MHz

PD633A*
PD633-6A*
***Exact Tx and Rx frequencies must be specified.**

The PD633A Mobile Duplexer uses 4 capacitively tuned TEM resonators in a compact extruded 6063-T6 aluminum housing. The aluminum is iridited and the entire unit painted for additional protection. Specifications are given here for 5 MHz and 10 MHz separations.

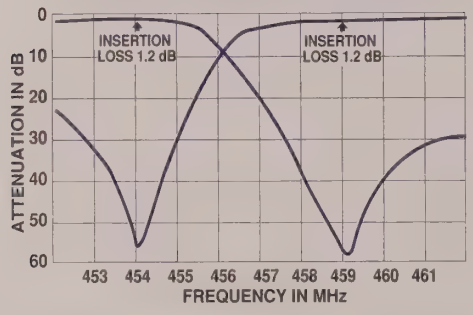
The PD633-6A Mobile Duplexer uses 6 resonators and cabling similar to PD633A. Two additional cavities provide the added isolation required in some systems. Specifications are given here for both 5 MHz and 10 MHz separations.

Both duplexers use solid shield copper jacketed Teflon® intercabling for low loss.

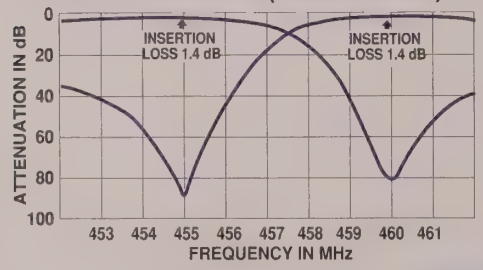
- **Low loss** — Maximizes system performance.
- **High isolation** — Minimizes interference.
- **Compact** — Minimizes space requirements.

Teflon® is a registered trademark of Du Pont.

PD633A RESPONSE CURVES (Typical)
5 MHz SPACING (435-470 MHz)



PD633-6A RESPONSE CURVES (Typical)
5 MHz SPACING (435-470 MHz)



Ordering Information

Item Number	Frequency Spacing-MHz	Frequency Range-MHz
PD633A-1	5	406-440*
PD633A-2	5	440-470*
PD633A-3	5	470-512*
PD633A-4	10	406-470*
PD633A-5	10	470-512*

Item Number	Frequency Spacing-MHz	Frequency Range-MHz	Connector
PD633-6A-1	5	406-450*	BNC
PD633-6A-1N	5	406-450*	N-female
PD633-6A-2	5	450-470*	BNC
PD633-6A-2N	5	450-470*	N-female
PD633-6A-3	3	470-495*	BNC
PD633-6A-4	3	490-512*	BNC
PD633-6A-5	10	406-450*	BNC
PD633-6A-6	10	450-470*	BNC
PD633-6A-6N	10	450-470*	N-female
PD633-6A-7	10	470-512*	BNC
PD633-6A-8	10	355-406*	BNC

***Exact Tx and Rx frequencies must be specified.**

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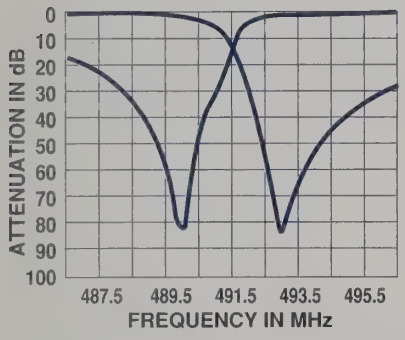
UHF Duplexers

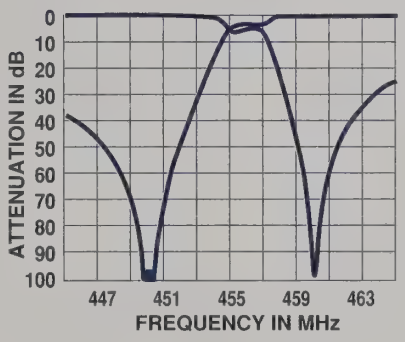
ELECTRICAL SPECIFICATIONS	PD633A	PD633A	PD633-6A	PD633-6A
Frequency Range - MHz	406-512	406-512	406-512	335-512
Frequency Spacing - MHz	5	10	5	10
Continuous Power Input - Watts	50	50	50	50
Insertion Loss, Tx - Ant. - dB	1.2	0.8	1.4	1.2
Insertion Loss, Rx - Ant. - dB	1.2	0.8	1.4	1.2
Tx Noise Suppression at Rx Frequency - dB	50	60	75	80
Rx Isolation at Tx Frequency - dB	50	60	75	80
VSWR - Max.	1.3:1	1.3:1	1.3:1	1.3:1
Impedance - Ohms	50	50	50	50
Connector	BNC female (Std.), N-female (Optional)			
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)			

MECHANICAL SPECIFICATIONS	PD633A	PD633A	PD633-6A	PD633-6A
Height - in. (mm)	1-1/4 (31.8)	1-1/4 (31.8)	1-1/4 (31.8)	1-1/4 (31.8)
Width - in. (mm)	4-1/8 (105)	4-1/8 (105)	6-3/16 (157)	6-3/16 (157)
Length - in. (mm)	9-1/2 (241)	9-1/2 (241)	9-1/2 (241)	9-1/2 (241)
Weight - lbs. (kg)	2 (0.9)	2 (0.9)	3-1/2 (1.7)	3-1/2 (1.7)

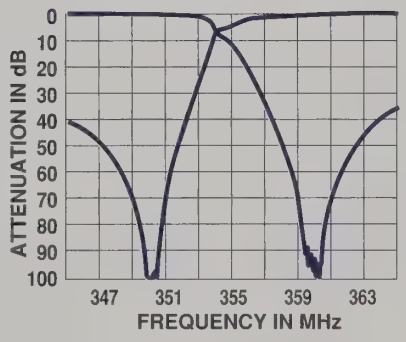
PD633-6A-4 RESPONSE CURVES 3 MHz SPACING (490-493 MHz)



PD633-6A-6 RESPONSE CURVES 10 MHz SEPARATION (450-460 MHz)



PD633-6A-8 RESPONSE CURVES 10 MHz SEPARATION (350-360 MHz)



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Dual Notch High Selectivity Duplexers

406-512 MHz

PD526*

***Exact Tx and Rx frequencies must be specified.**

These Celwave units use a total of six pass-reject dual-notch resonators with three resonators per channel as the normal arrangement. They are suitable for many applications other than duplexing and their dual-notch circuitry provides a pseudo band-pass characteristic for high Tx-Rx isolation. These units are available with reversible mounting brackets to allow flush rack mounting with connections in the rear. Specify PD526-4-SR or PD526-5-SR. Intercabling is exclusively RG214/U cable.

- **High isolation** — Minimizes interference.
- **Temperature compensated** — Assures consistent performance across temperature and power range.
- **Low insertion loss** — Maximizes effective radiated power.

Ordering Information

Duplexers

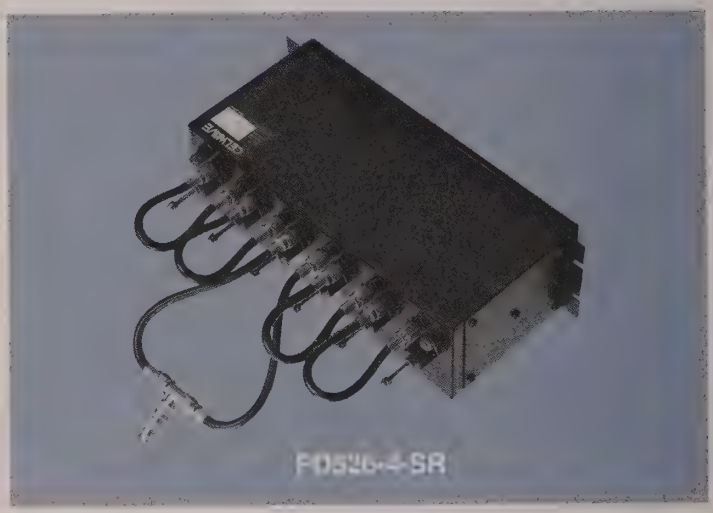
Item Number	Frequency Range-MHz
PD526-4-1	406-440*
PD526-4-2	435-470*
PD526-5	470-512*

Reverse Mount Option: Specify SR after ordering number.

Cable Kits

Item Number	Frequency Range-MHz
043102001	406-425
043102002	425-450
043102003	450-470
043102004	470-490
043102005	490-512

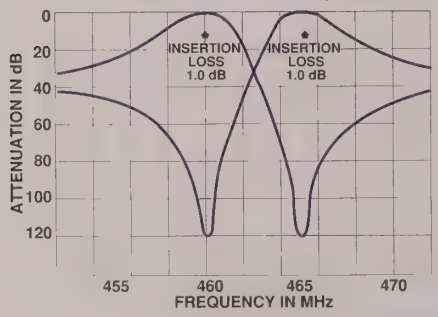
***Exact Tx and Rx frequencies must be specified.**



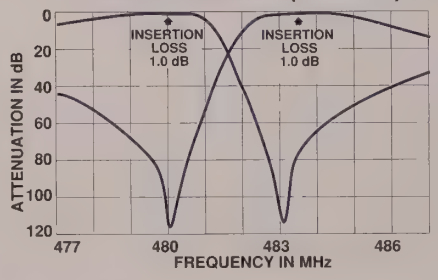
ELECTRICAL SPECIFICATIONS	PD526-4	PD526-5
Frequency Range - MHz	406-470	470-512
Frequency Spacing - MHz	5 (min.)	3 (min.)
Continuous Power Input - Watts	250	250
Insertion Loss Tx-Ant. - dB	1.0	1.0
Insertion Loss Rx-Ant. - dB	1.0	1.0
Tx Noise Suppression at Rx Frquency - dB	120	100
Rx Isolation at Tx Frequency - dB	120	100
Maximum VSWR	1.3:1	1.3:1
Impedance - Ohms	50	50
Connector Type	N-female	N-female
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	

MECHANICAL SPECIFICATIONS	PD526-4	PD526-5
Height - in. (mm)	5-1/4 (133)	5-1/4 (133)
Width - in. (mm)	rack panel 19 (483)	rack panel 19 (483)
Depth - in. (mm)	14 (356)	14 (356)
Weight - lbs. (kg)	23 (10.5)	23 (10.5)

PD526-4 RESPONSE CURVES (Typical)
5 MHz SPACING (406-470)



PD526-5 RESPONSE CURVES (Typical)
3 MHz SPACING (470-512)



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Dual Notch Duplexers

406-960 MHz

PD696-4*	406-470 MHz
PD696-5*	470-512 MHz
PD896*	806-960 MHz

*** Exact Tx and Rx frequencies must be specified. Specify SR for Reverse Mount Option.**

These duplexers combine two pass reject cavities in each channel. Each cavity incorporates a unique loop structure to minimize the number of cable-to-connector joints. Double shielded jumpers are used for all intercabling and the dual notch circuitry provides a pseudo bandpass characteristic at wider frequency spacings.

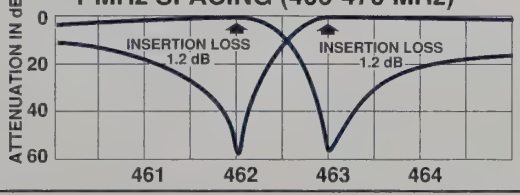
The PD696 employs four PD695 cavities for UHF applications with frequency spacings as close as 1 MHz. The PD896 uses four PD895 cavities with spacing as close as 3.6 MHz.

- **Temperature compensated** — Ensures stability over operating temperature range.
- **Low loss** — Maximizes system performance.
- **High isolation** — Minimizes interference.

ELECTRICAL SPECIFICATIONS	PD696-4	PD696-4	PD696-5	PD896
Frequency Range - MHz	406-470	406-470	470-512	806-960
Frequency Spacing - MHz	1 or more	5 or more	3 or more	3.6 or more
Continuous Power Input - Watts	150	250	100	100
Insertion Loss Tx-Ant. - dB	1.2	.8	1.5	1.2
Insertion Loss Rx-Ant. - dB	1.2	.8	1.5	1.2
Tx Noise Suppression at Rx Frequency - dB	50	85	80	70
Rx Isolation at Tx Frequency - dB	50	85	80	70
Maximum VSWR	1.5:1	1.3:1	1.3:1	1.3:1
Impedance - Ohms	50	50	50	50
Connector Type	N-female	N-female	N-female	N-female
Temperature Range - °F (°C)		$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		

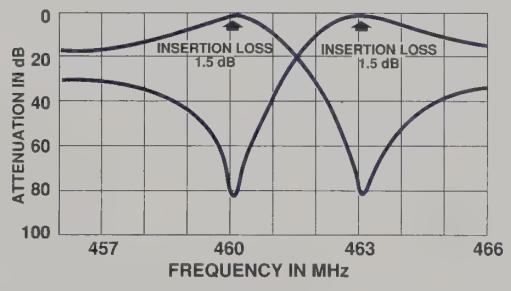
MECHANICAL SPECIFICATIONS	PD696-4	PD696-4	PD696-5	PD896
Height - in. (mm)	5-1/4 (133)	5-1/4 (133)	5-1/4 (133)	5-1/4 (133)
Width, Rack Panel - in. (mm)	19 (483)	19 (483)	19 (483)	19 (483)
Depth - in. (mm)	12 (305)	12 (305)	12 (305)	9 (229)
Weight - lbs. (kg)	23 (10.5)	23 (10.5)	23 (10.5)	21 (9.45)

PD696-4 RESPONSE CURVES (Typical)
1 MHz SPACING (406-470 MHz)

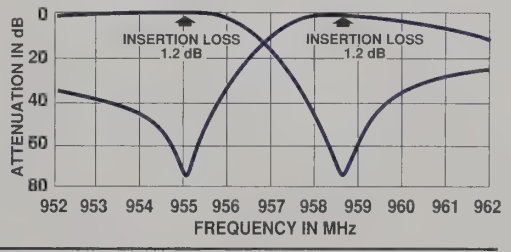


PD696-4 RESPONSE CURVES (Typical)
5 MHz SPACING
(406-470 MHz)

PD696-5 RESPONSE CURVES (Typical)
3 MHz SPACING
(470-512 MHz)



PD896 RESPONSE CURVES (Typical)
3.6 MHz SPACING
(806-960 MHz)



High Selectivity, High Power Band Pass Duplexer

806-960 MHz

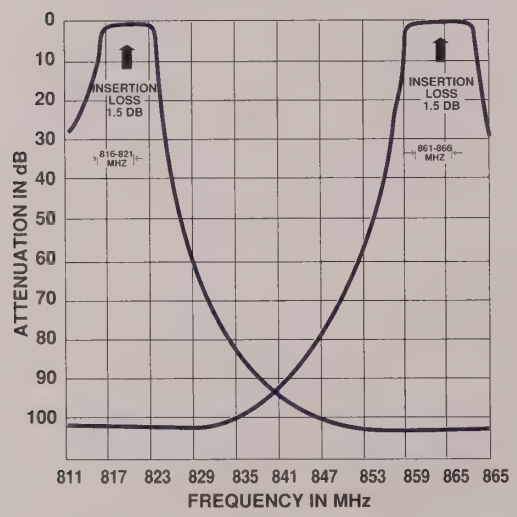
PD5043-8* 806-960 MHz

*** Exact Tx and Rx frequencies must be specified.**

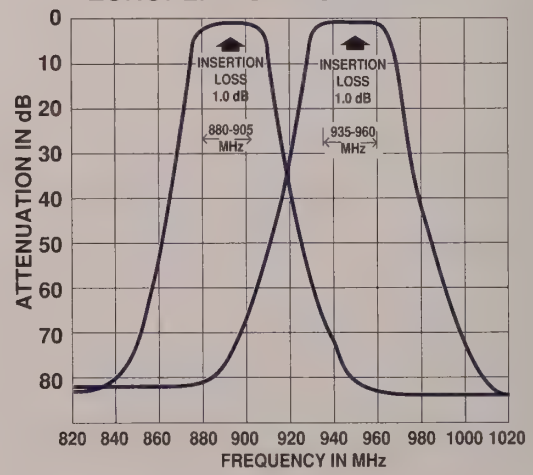
This duplexer is well suited for full bandwidth coverage in cellular or trunking operations for either European or North American frequencies. The unit is capable of handling 600 Watts, may be mounted to occupy only four vertical rack spaces including the antenna connector panel and can be engineered to accommodate special response requirements. Contact our Customer Service Department for special requirements.

- **Low loss** — Maximizes system performance.
- **High isolation** — Minimizes interference.
- **Temperature compensated** — Ensures consistent performance across temperature and power range.

PD5043-8 RESPONSE CURVE (Typical)
45 MHz SPACING
(816-821 MHz) (861-866 MHz)
TRUNKING BAND



PD5043-8 RESPONSE CURVE (Typical)
55 MHz SPACING
(880-905 MHz) (935-960 MHz)
EUROPEAN CELLULAR BAND



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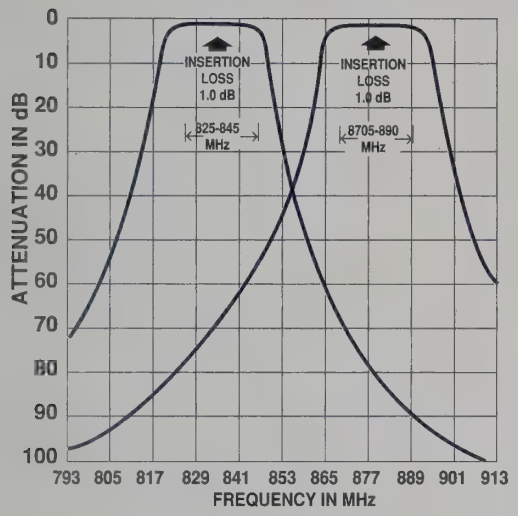
High Selectivity, High Power Band Pass Duplexer

PD5043-8 RESPONSE CURVE (Typical)
45 MHz SPACING
(825-845 MHz) (870-890 MHz)
CELLULAR BAND



ELECTRICAL SPECIFICATIONS	PD5043-8	PD5043-8	PD5043-8
Frequency Range - MHz	816-821 Rx 861-866 Tx	825-845 Rx 870-890 Tx	880-905 Rx 935-960 Tx
Frequency Spacing - MHz	45	45	55
Continuous Power Input - Watts	400*	600*	600*
Insertion Loss Tx-Ant. - dB	1.5	1.0	1.0
Insertion Loss Rx-Ant. - dB	1.5	1.0	1.0
Tx Noise Supression at Rx Frequency - dB	90	60	60
Rx Isolation at Tx Frequency - dB	90	60	60
Maximum VSWR (50 Ohms)	1.3:1	1.3:1	1.3:1
Impedence - Ohms	50	50	50
Connector	N-female	N-female	N-female
Temperature Range - °F (°C)	⁻22 to ⁺140 (⁻30 to ⁺60)		

*At 10 MHz or greater bandwidth

MECHANICAL SPECIFICATIONS	PD5043-8 Vertical Mounting	PD5043-8 Back-to-Back Mounting
Height - in. (mm)	10-5/8 (270)	7 (178)
Width - in. (mm)	19 (483)	19 (483)
Length - in. (mm)	10 (254)	18-7/8 (479)
Weight - lbs. (kg)	26-1/2 (12)	26-1/2 (12)

Mounts in standard 19 in. (483) E.I.A. Rack Panel.

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Expanded Spectrum Duplexers

824-894 MHz

PD5188-14 **Wireline**
PD5188-25 **Non-wireline**

These specially designed E AMPS Cellular duplexers are available for either wireline (PD5188-14) or non-wireline (PD5188-25) applications. Both allow the system operator to reduce the number of antennas needed at the cell site with only 1.0 dB insertion loss. These compact, broadband duplexers are ideal where space is limited and operate continuously up to 500 Watts.

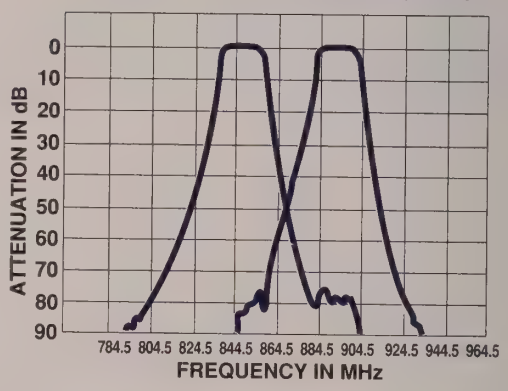
- **Low loss** — Minimizes Rx noise, maximizes Tx ERP
- **Reduced site requirements** — Less antenna and component space required.
- **High power capability** — Operates up to 20, 45 Watt transmitters.

ELECTRICAL SPECIFICATIONS	PD5188-14	PD5188-25
Frequency Range - MHz	824-894	824-894
Bandwidth - MHz Tx Rx	14 (880-894) (835-849)	25 (869-894) (824-849)
Insertion Loss - max. dB	1.0	1.0
Transmit Noise Suppression	@ 849 MHz > 75 dB	@ 849 MHz > 60 dB
Receiver Isolation	@ 880 MHz > 75 dB	@ 869 MHz > 60 dB
Impedance - Ohms	50	50
VSWR max.	1.5:1	1.5:1
Power - Watts	500	500
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)

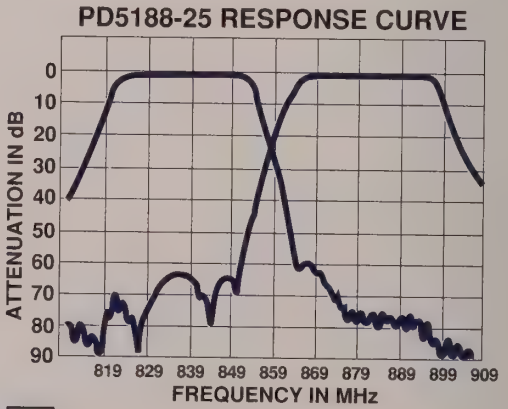
MECHANICAL SPECIFICATIONS	PD5188-14	PD5188-25
Connectors -Tx, Rx, Ant. Coupling Probe	N-female BNC-female	N-female BNC-female
Dimensions - in. (mm) H x W x D	3-1/2 x 19 x 12 (89 x 483 x 305)	3-1/2 x 19 x 12 (89 x 483 x 305)
Weight - lbs. (kg)	14 (6.3)	14-3/4 (6.6)

Mounts in standard 19 in. (483 mm) E.I.A. rack panel.

PD5188-14 RESPONSE CURVE



PD5188-25 RESPONSE CURVE



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Combline Bandpass Duplexers/Filter

806-960 MHz

PD5134-10*	806-866 MHz
PD5134-10T*	851-866 MHz
PD5122-10*	890-960 MHz
PD5134-18*	806-869 MHz

***Exact Tx and Rx frequencies must be specified.**

These combline bandpass filters are designed specifically for 800 and 900 MHz trunking applications.

The PD5134-10 and the PD5134-18 are compact duplexers covering 10 MHz and 18 MHz, respectively, of the lower trunking band. Construction is of copper plated aluminum with copper resonators. The PD5134-10 and PD5134-18 duplexers and the PD5134-10T transmit filter, all mount on a 3-1/2" x 19" rack panel.

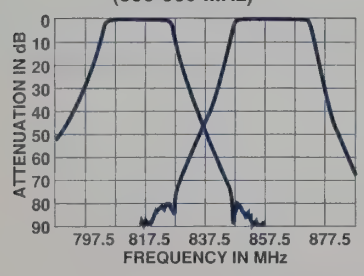
The PD5122-10 duplexer is for 900 MHz trunking applications. The units feature low insertion loss and have power handling capability of 500 Watts. Typical response curves are shown below.

ELECTRICAL SPECIFICATIONS	PD5122-10	PD5134-18	PD5134-10	PD5134-10T
Tx Frequency Range - MHz	896-902	851-869	851-866	851-866
Rx Frequency Range - MHz	935-941	806-824	806-821	—
Frequency Spacing - MHz	39	45	45	—
Continuous Power Input - Watts	500	400	400	400
Insertion Loss Tx - Ant - dB	1.0	1.2	1.0	1.0
Insertion Loss Rx - Ant - dB	1.0	1.2	1.0	—
Tx Noise Suppression at Rx Frequency - dB	70	75	85	80
Rx Isolation at Tx Frequency - dB	70	75	95	—
Maximum VSWR	1.5:1	1.5:1	1.5:1	1.5:1
Impedance - Ohms	50	50	50	50
Connector	N-female	N-female	N-female	N-female
Temperature Range - °F (°C)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)

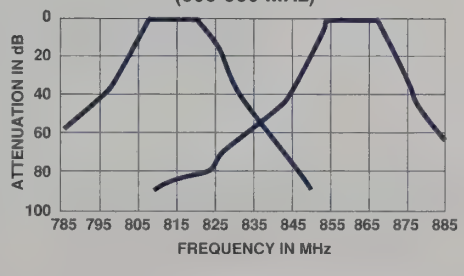
MECHANICAL SPECIFICATIONS	PD5122-10	PD5134-18	PD5134-10	PD5134-10T
Height - in. (mm)	3-1/2 (89)	3-1/2 (89)	3-1/2 (89)	3-1/2 (89)
Width - in. (mm)	19 (483)	19 (483)	19(483)	19 (483)
Depth - in. (mm)	10 (254)	10 (254)	10 (254)	10 (254)

Mounts in standard 19 in. (483 mm) E.I.A. Rack Panel.

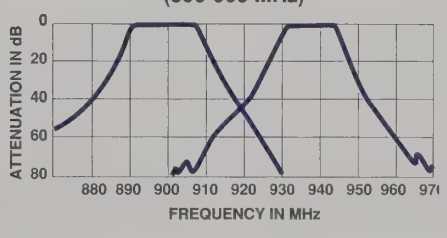
PD5134-18 RESPONSE CURVE (Typical)
45 MHz SPACING
(806-869 MHz)



PD5134-10 RESPONSE CURVE (Typical)
45 MHz SPACING
(806-866 MHz)



PD5122-10 RESPONSE CURVE (Typical)
39 MHz SPACING
(890-960 MHz)



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Cellular Transmit Filters

869-894 MHz

PD5192-14N*	**Wireline**
PD5192-25N*	**Non-Wireline**
PD5192-14L*	**Wireline**
PD5192-25L*	**Non-Wireline**

***Exact frequencies must be specified.**

This series of specially designed transmit filters is available for AMPS cellular wireline and non-wireline applications. The PD5192-14N and PD5192-25N are mid-power filters with 800 Watts maximum power handling capability. The PD5192-14L and PD5192-25L are high power filters with 1200 Watt power capability. The PD5192 Series provides Tx noise suppression of at least 50 dB at 849 MHz and less than .5 dB insertion loss for maximum ERP. All filters are constructed with a unique design to provide exceptional protection from the higher voltage levels of added spectrum channels. LC connectors on the -L versions are standard.

• **Expanded spectrum compatible**	Broadbanded, available for either wireline or non-wireline.
• **Low loss**	Maximizes range, minimizes effects of heating.
• **Compact 3.5" vertical rack space**	Minimizes cell site space requirements.
• **High Tx suppression**	Minimizes transmitter noise to improve system performance.

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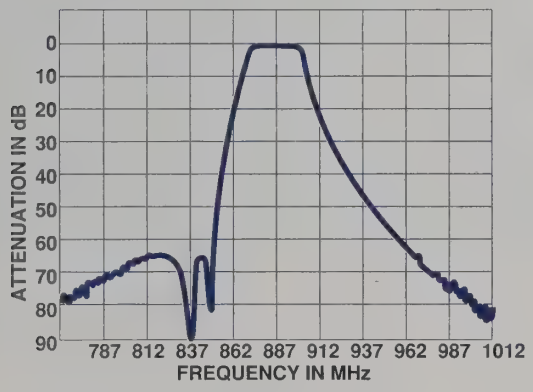
Cellular Transmit Filters

ELECTRICAL SPECIFICATIONS	PD5192-14N	PD5192-14L	PD5192-25N	PD5192-25L
Frequency Range - MHz	880-894	880-894	869-894	869-894
Bandwidth - MHz	14	14	25	25
Insertion Loss - dB	<.50	<.50	<.50	<.50
Return Loss - dB	15	15	15	15
Attenuation @ 849 - dB	>60	>60	>50	>50
Power - Watts max.	800	1200	800	1200
VSWR max.	1.5:1	1.5:1	1.5:1	1.5:1
Impedance - Ohms	50	50	50	50
Temperature - °F (°C)	⁻22 to ⁺140 (⁻30 to ⁺60)	⁻22 to ⁺140 (⁻30 to ⁺60)	⁻22 to ⁺140 (⁻30 to ⁺60)	⁻22 to ⁺140 (⁻30 to ⁺60)

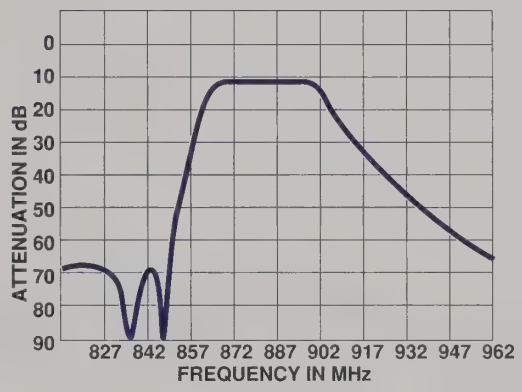
MECHANICAL SPECIFICATIONS	PD5192-14N	PD5192-14L	PD5192-25N	PD5192-25L
Height - in. (mm)	3-1/2 (89)	3-1/2 (89)	3-1/2 (89)	3-1/2 (89)
Width - in. (mm)	19 (483)	19 (483)	19 (483)	19 (483)
Depth - in. (mm)	12 (305)	12 (305)	12 (305)	12 (305)
Weight - lbs. (kg)	7-3/4 (3.5)	7-3/4 (3.5)	7-3/4 (3.5)	7-3/4 (3.5)
Connectors	N-female	LC-female	N-female	LC-female

Mounts in Standard 19 in. (483 mm) E.I.A. Rack Panel.

PD5192-14 RESPONSE CURVE



PD5192-25 RESPONSE CURVE



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Cellular Preselectors

824-849 MHz

CFX836-6N*	**Non-wireline**
CFX836-8N*	**Non-wireline**
CFX836-8W*	**Non-wireline**
CFX842-6*	**Wireline**
CFX842-8*	**Wireline**

***Exact frequencies must be specified.**

These compact units are designed for use in AMPS cellular expanded frequency receiver multicoupling systems as direct replacements for an existing 10 MHz preselector. The CFX836 models (Bandwidth: 22.5 and 25 MHz) and the CFX842 models (Bandwidth: 14 MHz) accomodate expanded frequencies. Standard units have six proximity coupled resonators. Eight resonator versions increase attenuation at 851 MHz. All units feature copper plated construction, superb temperature compensation and maintain rated specifications from ⁻22° to ⁺140°F.

- **Low loss** — Enhanced performance in high RF density areas.
- **Copper plating** — Inhibits corrosion, reduces intermodulation susceptibility.
- **Test port** — Easy sampling of Rx signals without system interruption.

ELECTRICAL SPECIFICATIONS	CFX836-6N	CFX836-8N	CFX836-8W	CFX842-6	CFX842-8
Frequency Range - MHz	824-846.5	824-846.5	824-849	835-849	835-849
Number of Resonators	6	8	8	6	8
Insertion Loss - dB	1.0	1.5	1.0	1.5	1.4
0.5 dB Bandwidth - MHz	22.5	22.5	25	14	14
Return Loss - dB (min.)	15	15	15	15	15
Connectors	N-female	N-female	N-female	N-female	N-female
Temperature Range - °F (°C)	⁻22 to ⁺140 (⁻30 to ⁺60)				

MECHANICAL SPECIFICATIONS	CFX836-6N	CFX836-8N	CFX836-8W	CFX842-6	CFX842-8
Height - in. (mm)	1-1/4 (31.8)	1-5/16 (33.3)	1-5/16 (33.3)	1-1/4 (31.8)	1-5/16 (33.3)
Width - in. (mm)	5-1/4 (133.4)	10-6/64 (256.3)	10-6/64 (256.3)	9-3/5 (243.8)	10-6/64 (256.3)
Depth - in. (mm)	8-1/2 (216)	4-3/4 (120.7)	4-3/4 (120.7)	5-1/4 (133.4)	4-3/4 (120.7)
Weight - lbs. (kg)	2-1/4 (1.01)	2-1/4 (1.01)	2-1/4 (1.01)	2-1/4 (1.01)	2-1/4 (1.01)

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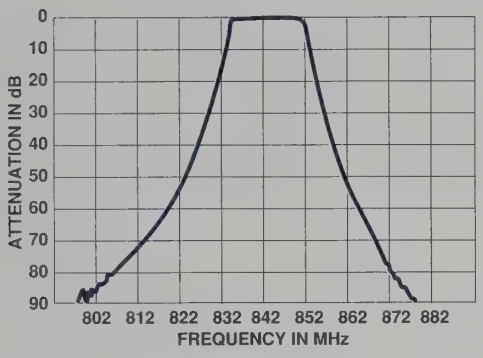
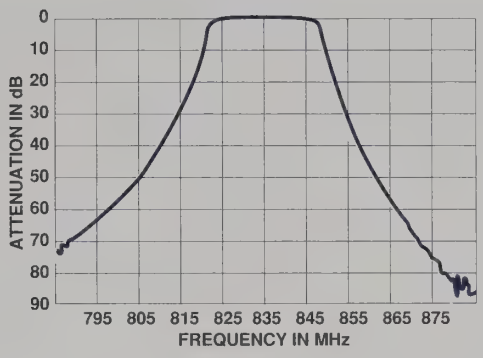
Cellular Preselectors

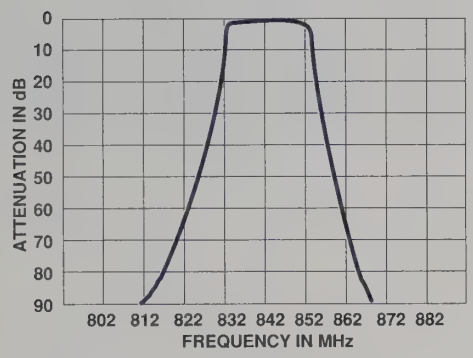
CFX842-6
RESPONSE CURVE



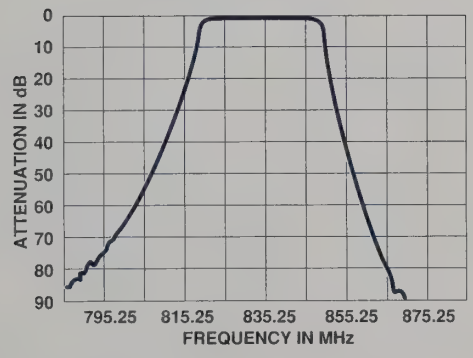
CFX836-6N
RESPONSE CURVE



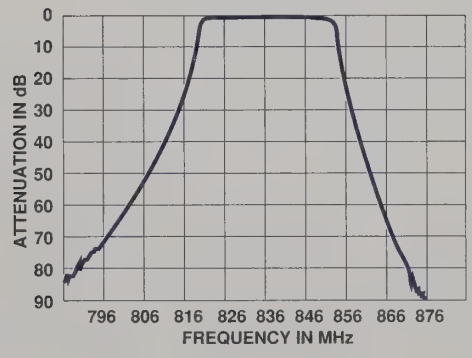
CFX842-8
RESPONSE CURVE



CFX836-8N
RESPONSE CURVE



CFX836-8W
RESPONSE CURVE



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Wireline Receive Filter

835-849 MHz

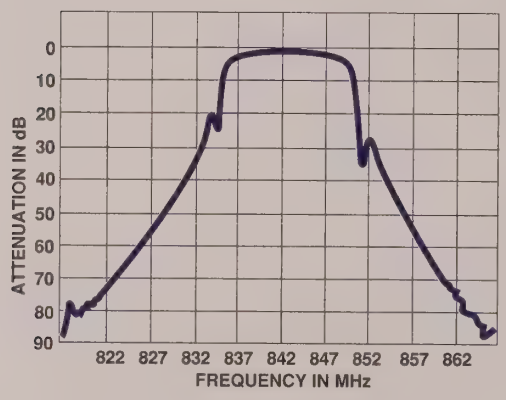
PD5094-14BA* Wireline Replacement

***Exact frequencies must be specified.**

This Receive filter is specially designed as a direct replacement for the filter furnished with AT&T cellular systems. The PD5094-14BA provides enhanced receiver performance by providing increased attenuation at 851 MHz and at the top end of the non-wireline band without significantly increasing passband insertion loss. The slide-in design of this filter enables system designers the latitude of upgrading without extensive reworks.

- **Higher selectivity** — Improves system performance over standard filter.
- **Low loss** — Improved noise level for system users.
- **Easy retrofit** — Quick installation, lower labor costs.

PD5094-14BA RESPONSE CURVE



ELECTRICAL SPECIFICATIONS	PD5094-14BA	
Frequency Range - MHz	835-849	
Bandwidth - MHz	14	
Insertion Loss - dB	@ 835.02 MHz @ 835.65 MHz @ 842 MHz @ 849 Mhz	3.5 max. 2.0 max. 1.0 max. 2.0 max.
VSWR	1.5:1 max.	
Return Loss - dB	15 min.	
Impedance - Ohms	50	
Attenuation - dB	@ 834.36 MHz @ 851 MHz @ 869 MHz @ 880 MHz	20 min. 25 min. 90 min. 90 min.
Temperature - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	

MECHANICAL SPECIFICATIONS	PD5094-14BA
Height - in. (mm)	2-3/16 (55.5)
Width - in. (mm)	22-1/4 (565)
Depth - in. (mm)	6 (152.4)
Weight - lbs. (kg)	5-3/4 (2.58)
Connectors	N-female

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E AMPS Wireline & Non-Wireline Filters

824-846.5 MHz

PD5185-2 **Wireline**
PD5195-1 **Non-Wireline**

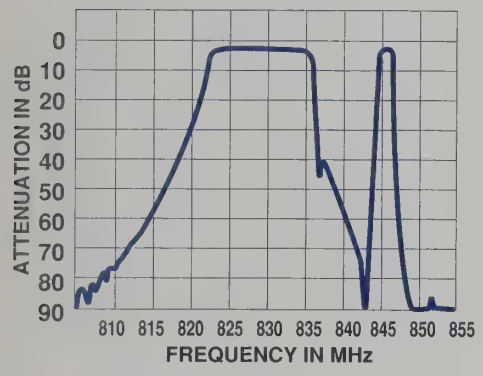
The 5195-1 is a composite filter for cellular non-wireline receiver applications. The filter assembly employs a conventional combline band pass filter covering 824-835 MHz and a dielectric band pass filter covering 845-846.5 MHz. Paralleling the two gives a double passband response which covers the non-wireline A and A' bands.

The 5185-2 dielectric notch filter is composed of 5 dielectric resonators. The filter maximizes the notch attenuation between 845 and 846.5 MHz, reducing possible intermodulation in the receiver front end due to interference from non-wireline subscriber units.

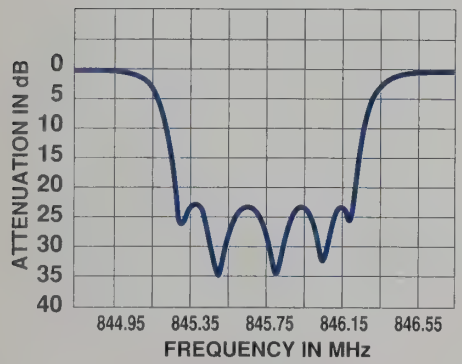
- **Highly selective** — Minimizes interference from competing carrier.

PD5185 Patent No.s 4,862,122 and 4,896,125

PD5195-1 RESPONSE CURVE



PD5185-2 RESPONSE CURVE



ELECTRICAL SPECIFICATIONS	PD5185-2	PD5195-1
Reject Frequency Band - MHz	845-846.5	—
Bandpass Frequency - MHz	835-845, 846.5-849	824-835, 845-846.5
Insertion Loss - dB		
@ 835/849 MHz	.3 max.	—
@ 845/846.5 MHz	1.0 max.	—
@ Room Temperature	—	2.3 max.
@ Extreme Temperature	—	2.5 max.
Return Loss - dB	14 min.	14 min.
Attenuation Typical - dB	1 MHz 20 dB Notch BW	@821 16 @837 35 @844.2 35 @847.2 40
Impedance - Ohms	50	50
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)

MECHANICAL SPECIFICATIONS	PD5185-2	PD5195-1
Dimensions - in. (mm) W x H x D Rack Mountable Tray	19 x 7 x 18 (483 x 178 x 457)	19 x 7 x 18 (483 x 178 x 457)
Weight - lbs. (kg)	25 (11)	25 (11)
Connectors	N-female	N-female
Mounts in Standard 19 in. (483 mm) E.I.A. Rack Panel.		

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Cellular and Trunking Receive Filter

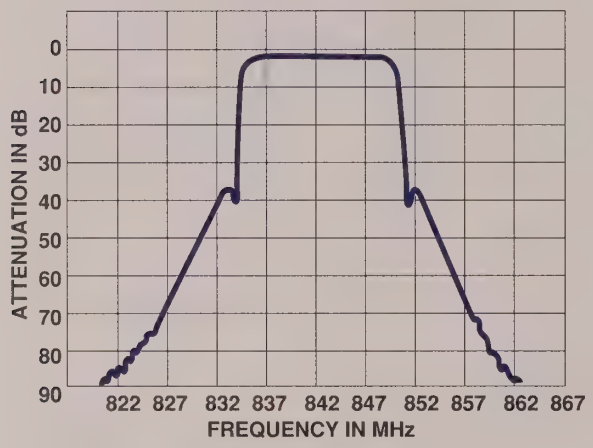
835-849 MHz

PD5198 — Wireline

This Celwave wireline filter is specially designed for sharp attenuation of the "A" cellular and trunking bands. The land-mobile and SMR frequencies are rejected by a minimum of 35 dB above 851 MHz. This combline filter uses a unique, folded design to save space.

- **Compact** — Reduces cell site equipment requirements.
- **Low loss** — Maximizes signal reception.
- **High stability** — Eliminates retuning.
- **High selectivity** — Lowers noise levels.

PD5198 RESPONSE CURVE



ELECTRICAL SPECIFICATIONS		PD5198
Frequency Range - MHz		835-849
Bandwidth - MHz		14
Insertion Loss- dB	@ 835 @ 845 @ 849	1.6 max. .95 max. 1.6 max.
Return Loss - dB		15
Attenuation - dB	@ 833 @ 851	35 min. 35 min.
VSWR, Max.		1.5:1
Impedance - Ohms		50
Temperature - °F (°C)		$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)

MECHANICAL SPECIFICATIONS	PD5198
Height - in. (mm)	4-1/8 (105)
Width - in. (mm)	6-1/4 (159)
Depth - in. (mm)	12-3/4 (324)
Weight - lbs. (kg)	6-1/2 (2.9)
Connectors	N-female

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Combline Bandpass Filter

896-902 MHz

PD5182-1 — 900 MHz Trunking

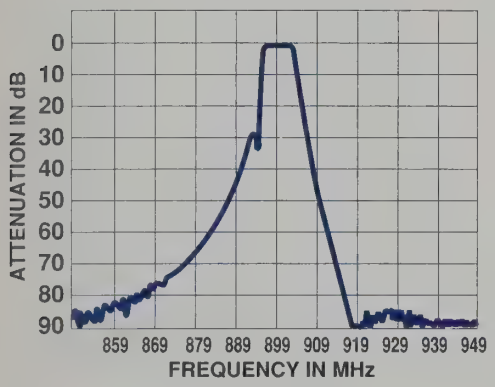
This Celwave unit has been specifically designed for 900 MHz trunking receive applications. Rack mountable, it features a special notch to attenuate extended spectrum wireline Tx frequencies allowing co-location with cellular systems.

- **High selectivity** — Minimizes trunking Rx desense.
- **Low loss** — Provides minimum system noise.
- **High isolation** — Affords maximum protection from other services.

ELECTRICAL SPECIFICATIONS		PD5182-1
Frequency - MHz		896-902
Bandwidth - MHz		6
Insertion Loss - dB		1.5 max.
Return Loss - dB		15 min.
Attenuation - dB	@ 894 MHz @ 935 MHz	25 min. 90 min.
Temperature Range - °F (°C)		$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)

MECHANICAL SPECIFICATIONS	PD5182-1
Dimensions - in. (mm) W x H x D	19 x 5-1/4 x 8 (483 x 133 x 203)
Connectors	N-female
Mounts in Standard 19 in. (483 mm) Rack Panel.	

PD5182 RESPONSE CURVE (896-902 MHz)



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Band Pass Filter

406-960 MHz

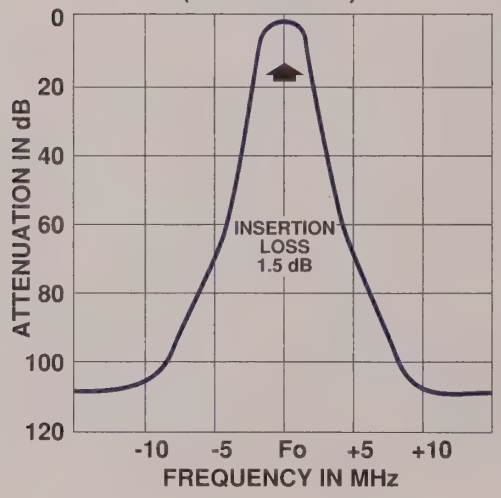
PD5044-4*	406-512 MHz
PD5044-8*	806-960 MHz

***Exact frequencies must be specified.**

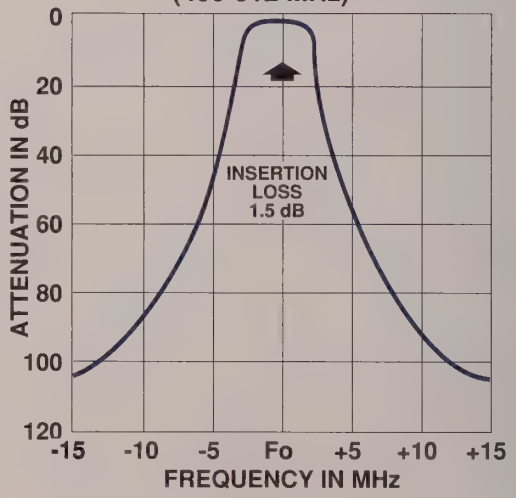
The PD5044-4 and PD5044-8 Band Pass Filters are 6-cavity devices which provide band pass characteristics for both transmitter and receiver applications in the UHF and 800 MHz frequency bands. Constructed of copper for frequency stability, the PD5044-8 is capable of power requirements that average 600 Watts. Both filters employ adjustable aperture coupling between resonators that are permanently fixed at the factory. The PD5044-4 operates over the 406-512 MHz range: PD5044-8 has a frequency range of 806-960 MHz encompassing both United States and European cellular and trunking applications.

- **Temperature compensated** — Ensures consistent performance across operating temperature range.
- **Compact** — Minimizes rack space requirements.
- **High isolation** — Minimizes receiver desense/transmitter noise.

PD5044-4 RESPONSE CURVE (Minimum)
2 MHz BANDWIDTH
(406-512 MHz)



PD5044-4 RESPONSE CURVE (Typical)
4 MHz BANDWIDTH
(406-512 MHz)



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Band Pass Filter

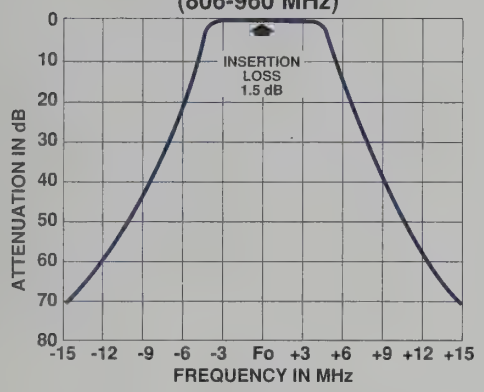
ELECTRICAL SPECIFICATIONS	PD5044-4	PD5044-4	PD5044-8	PD5044-8	PD5044-8	PD5044-8
Frequency Range - MHz	406-512	406-512	806-960	806-960	806-960	806-960
Continuous Power Input - Watts	100	100	600*	400	600*	600*
Bandwidth - MHz	2 (min.)	4	15	5	20	25
Insertion Loss - dB	1.5	1.0	1.0	1.5	0.8	0.8
Maximum VSWR	1.5:1	1.5:1	1.3:1	1.3:1	1.3:1	1.3:1
Impedence - Ohms	50	50	50	50	50	50
Connector Type	N-female	N-female	N-female	N-female	N-female	N-female
Temperature Range - °F (°C)			-22 to +140 (-30 to +60)			

* At 10 MHz or greater bandwidth.

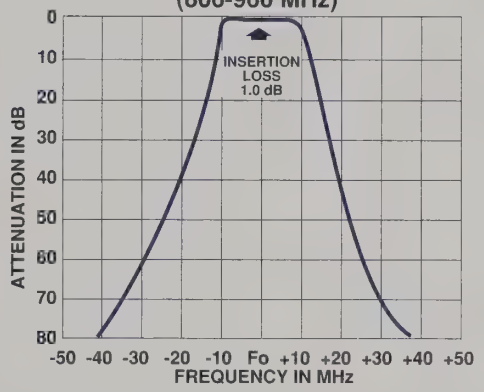
MECHANICAL SPECIFICATIONS	PD5044-4	PD5044-8
Height - in. (mm)	5-1/4 (133)	5-1/4 (133)
Width - in. (mm)	19 (483)	19 (483)
Depth - in. (mm)	12-1/4 (311)	8 (203)
Weight - lbs. (kg)	16 (7.3)	13 (5.9)

Mounts in Standard 19" (483 mm) E.I.A. Rack Panel.

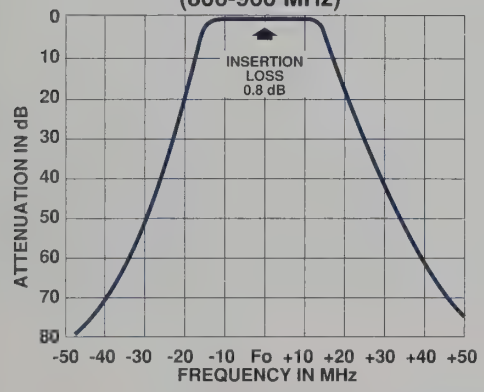
PD5044-8 RESPONSE CURVE (Typical)
5 MHz BANDWIDTH
(806-960 MHz)



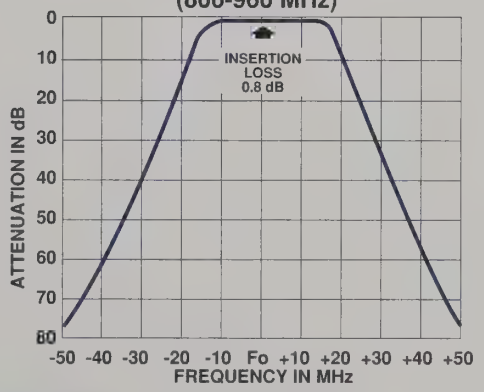
PD5044-8 RESPONSE CURVE (Typical)
15 MHz BANDWIDTH
(806-960 MHz)



PD5044-8 RESPONSE CURVE (Typical)
20 MHz BANDWIDTH
(806-960 MHz)



PD5044-8 RESPONSE CURVE (Typical)
25 MHz BANDWIDTH
(806-960 MHz)



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UHF Receive Filters

450-470 MHz

PD5102-6-4N
PD5102-6-4ND

These compact filters are designed for use in receiver multicoupling systems where high RF density environments exist. They feature copper plated construction with superb temperature compensation to maintain rated operation over -22° to 140°F.

The PD5102-6-4N is a 6 pole combline bandpass filter designed for 4 MHz passband width. Two additional reject poles provide greater than 30 dB attenuation at Fo ±3 MHz.

The PD5102-6-4ND is a dual filter composed of two PD5102-6-4N bandpass filters. This filter maximizes attenuation between the 4 MHz passbands of the individual PD5102-6-4N filters. Minimum separation between the two pass bands is 11 MHz center to center.

• **Low loss**	Enhanced performance in high RF density areas.
• **Copper plating**	Inhibits corrosion, reduces intermodulation susceptibility.

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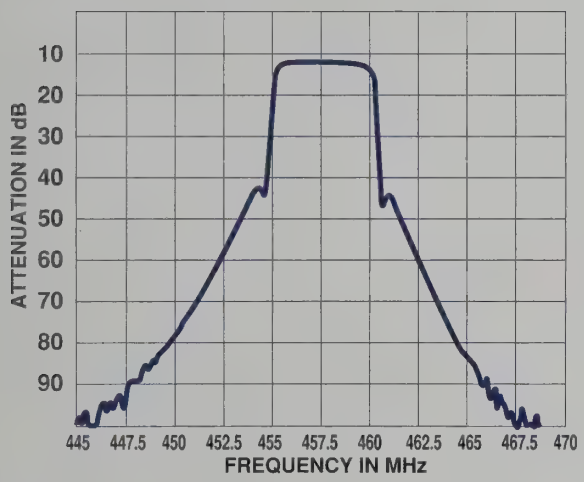
UHF Receive Filters

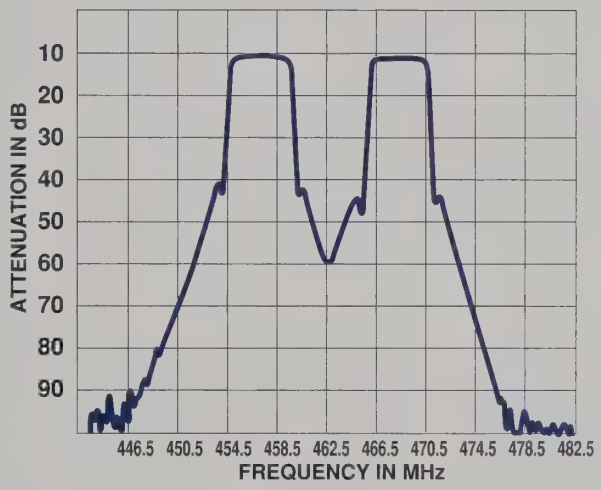
ELECTRICAL SPECIFICATIONS	5102-6-4N	PD5102-6-4ND
Frequency Range - MHz	450-470	450-470
Number of Resonators	6	12
Insertion Loss - dB	2.5	3 (max.)
0.5 dB Bandwidth - MHz	4	Dual 4 MHz Passbands
Return Loss - dB (min.)	15	15
Connectors	N-female	N-female
Temperature Range - °F (°C)	-22 to +140 (-30 to +60)	-22 to +140 (-30 to +60)

MECHANICAL SPECIFICATIONS	5102-6-4N	PD5102-6-4ND
Height - in. (mm)	2 (50.8)	4.5 (114.3)
Width - in. (mm)	8 (204)	8 (204)
Length - in. (mm)	21.5 (546.1)	21.5 (546.1)
Weight - lbs. (kg)	4.5 (2.05)	10 (4.55)

5102-6-4N RESPONSE CURVE



5102-6-4ND RESPONSE CURVE



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Compact Preselectors

66-512 MHz

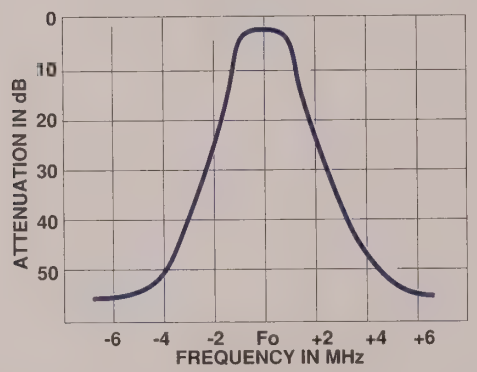
PD901-PB4*	66-88 MHz
PD911-PB4*	144-174 MHz
PD941-PB4*	406-474 MHz
PD951-PB4*	474-512 MHz

***Exact frequencies must be specified.**

These units are designed to provide selectivity in receiver multicoupling systems in high RF density environments. The PD901-PB4 and PB911-PB4 units employ four aperture coupled helical resonators. The PD941-PB4 and PD951-PB4 use coaxial resonators. All preselectors are constructed of extruded aluminum and are temperature compensated to achieve the electrical specifications over the operating temperature range. Multi-window configurations for specialized applications can be constructed. Please consult our Customer Service Department for details.

- **High selectivity** — Minimizes out of band interference.
- **Compact** — Facilitates ease of installation.
- **Temperature compensated** — Assures consistent performance.

PD901-PB4 RESPONSE CURVE (Typical)
(66-88 MHz)



With Connector Bracket

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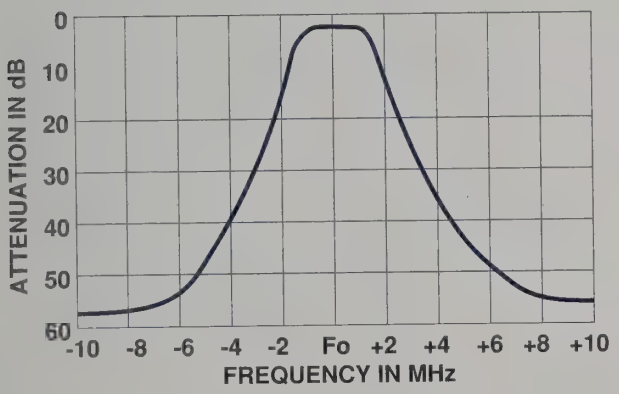
Compact Preselectors

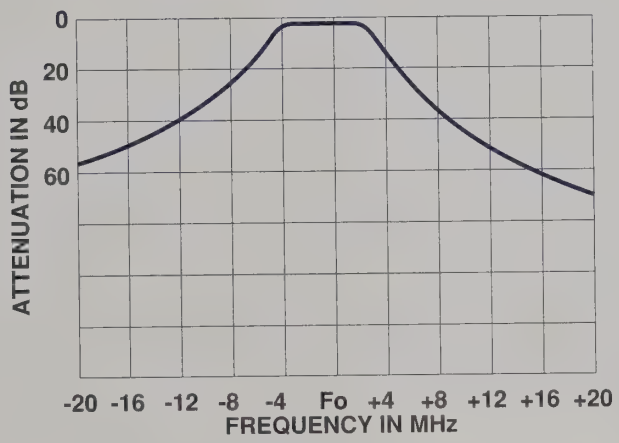
ELECTRICAL SPECIFICATIONS	PD901-PB4	PD911-PB4	PD941-PB4	PD951-PB4
Frequency Range - MHz	66-88	144-174	406-474	474-512
Number of Cavities	4	4	4	4
Insertion Loss - dB	2	1.5 2.25	1 1.5	1 1.5
0.5 dB Bandwidth - MHz Nominal	1.5	4 2	6 3	6 3
Maximum VSWR	1.5:1	1.5:1	1.5:1	1.5:1
Connectors	BNC female	BNC female	BNC female	BNC female
Temperature Range - °F (°C)		$^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)		

MECHANICAL SPECIFICATIONS	PD901-PB4	PD911-PB4	PD941-PB4	PD951-PB4
Height - in. (mm)	1-1/4 (31.8)	1-1/4 (31.8)	1-1/4 (31.8)	1-1/4 (31.8)
Width - in. (mm)	4-1/8 (105)	4-1/8 (105)	4-1/8 (105)	4-1/8 (105)
Depth - in. (mm) with Connector Bracket for Type N and UHF Connectors	4-11/16 (119) 6-3/4 (171)	4-11/16 (119) 6-3/4 (171)	7-3/16 (183) 9-1/4 (235)	6-15/16 (176) 9 (229)
Weight - lbs. (kg) Standard with Connector Table	1.8 (.8) 2 (.9)	1.8 (.8) 2 (.9)	1.8 (.8) 2 (.9)	1.8 (.8) 2 (.9)

PD911-PB4 RESPONSE CURVE (Typical)
(144-174 MHz)



PD941-PB4 and PD951-PB4
RESPONSE CURVE (Typical)
(406-512 MHz)



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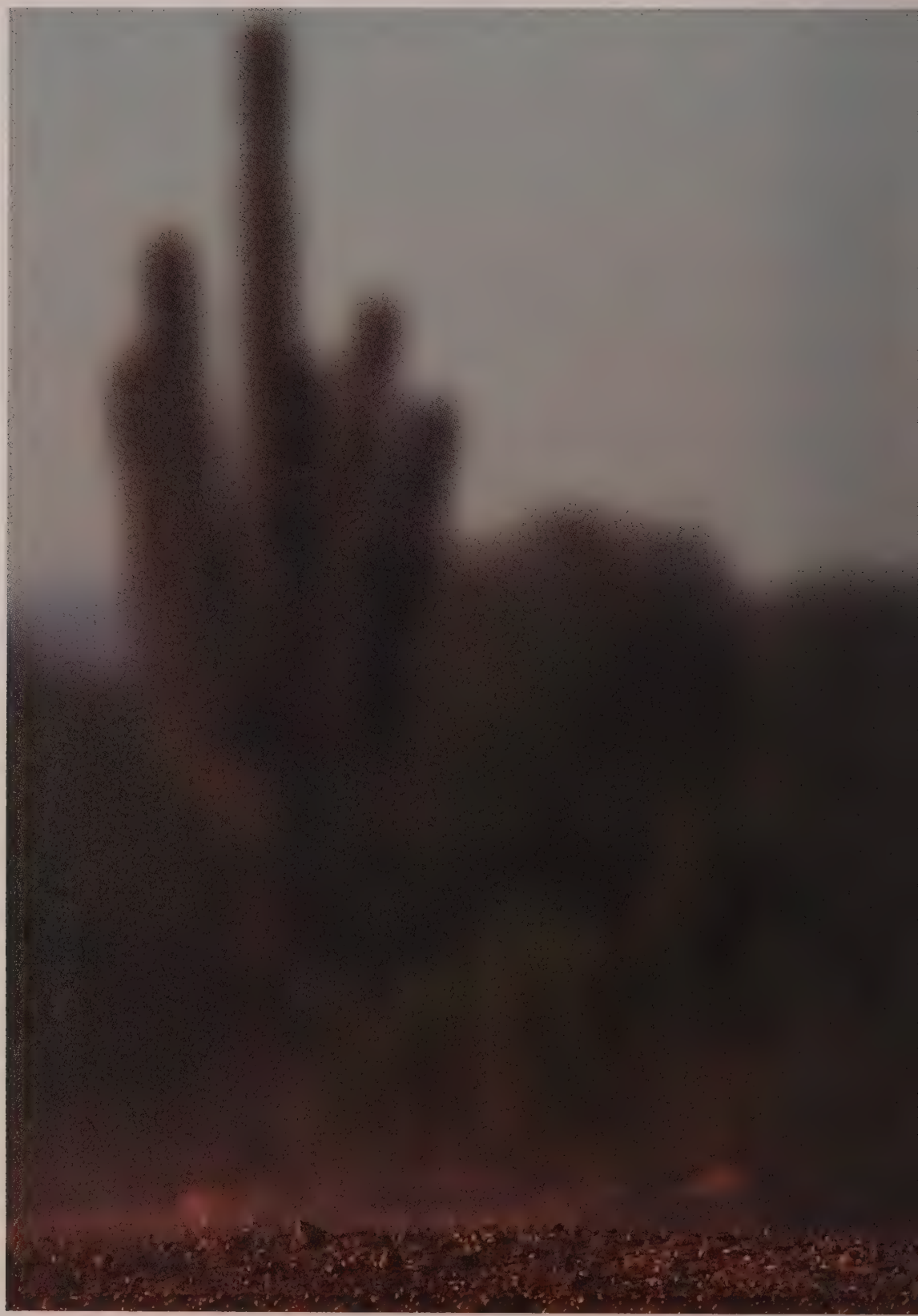
It was a bad day for the other guys at LaJara wash.



An oil man assigned to a rig in one of the deep canyons near Farmington, New Mexico, was barreling up the wash looking for a spot where his SMR phone would bounce out.

A man who does a lot of work for the same oil company was driving down the wash on his way to the rig.

Somewhere in the middle, their four wheelers met head-on. Nobody was hurt, but the oil man still couldn't get his phone to work. No problem. The fellow he'd hit reached into his totaled truck, keyed his mike and help was on the way.

The oil man couldn't figure out why. His SMR supplier has seven antenna sites. The other fellow's supplier, a Celwave client, only has one. It's on a mountain site you can only get to in summertime and when the wind's not blowing at 100 miles an hour. But there isn't a canyon, arroyo or wash within 100 miles the signal from that antenna doesn't reach into or get out of.

Now the oil company is talking about changing its SMR service.

Celwave has designed and equipped antenna systems to meet all kinds of needs all over the world. Sometime soon, we could do the same for you.

CELWAVE RFS

DIVISION OF RADIO FREQUENCY SYSTEMS

Let's talk about your future.

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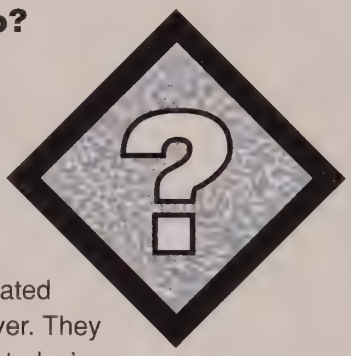
Introduction to Receiver Multicouplers

What Does It Do?



A receiver multicoupler allows the operation of two or more receivers connected to a common antenna with equal or superior performance to a dedicated antenna for each receiver. They are an essential part of today's modern, multi-channel antenna systems and their performance is measured against the following criteria:

Receiver Sensitivity

The most important factor in designing a receiver multicoupling system is receiver sensitivity. This is a measure of the receiver's ability to recover a useable signal from background.

The 12 dB SINAD calculation has become the industry standard for measuring receiver sensitivity, it is the ratio of two sums:

$$12\text{ dB SINAD} = \frac{\text{SIGNAL} + \text{NOISE} + \text{DISTORTION}}{\text{NOISE} + \text{DISTORTION}}$$

This measurement has gradually replaced the old 20 dB quieting standard which does not take into consideration distortion. Noise has always been a factor in RF Communications Systems whether it be man-made, atmospheric, or solar noise. Even the system components themselves (i.e. antenna, line, connectors) generate noise and therefore affect the total signal-to-noise ratio.

Noise Figure

Noise figure is a measurement which describes how well an RF circuit performs in the presence of noise. Before designing any receiver multicoupling system, it is important to get an indication of site noise. If the site noise level is .6 microvolt for example, there is no need to design a receiver multicoupler to maintain a system sensitivity greater than this. In general, however the lower the noise figure, the better the receiver. The noise figure is actually the direct measure of the noise added by the receiver to the thermal noise present at the output.

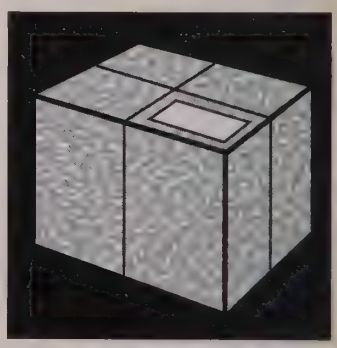
Any increase in the overall system noise figure would cause a corresponding decrease in receiver sensitivity.

Third Order Intercept

The third order intercept point is used to compare the performance of the various designs of amplifiers available. The third order intercept point can be considered a figure of merit proportional to the dynamic range of the amplifier. It is the theoretical output level at which the third order product and the fundamental response are equal. It is theoretical because the amplifier will go into gain compression 10 to 20 dB below the output intercept point. This specification provides a basis for comparison and helps determine the necessary control of signal levels to prevent detectable intermodulation.

The higher the third order intercept point (typically +30 to +43 dBM) the more capable the amplifier is of linear amplification without the generation of IM products. Receiver intermodulation occurs when two or more transmitter frequencies mix in the final output stage of the receiver.

A Complete Package



The four key components of a receiver multicoupler are supplied standard as a complete package by Celwave. These components are discussed briefly on the following page.

Introduction to Receiver Multicouplers

The Preselector

The preselector is the selective "front end" on a receiver multicoupler that excludes unwanted signals from entering the amplifier. It is one or more band pass filters in cascade and is available in varying degrees of selectivity depending on the application. In a low density RF environment, such as found in suburban or rural areas, a "low selectivity" preselector may be used. For dense RF environments, a "high selectivity" preselector with a narrow bandwidth and sharp skirts is used.

The insertion loss of the preselector adds directly to the overall effective noise figure for the system. Typically the higher the selectivity, the higher the insertion loss. The noise figure in the specifications of all Celwave receiver multicouplers, includes the preselector filter.

Multicouplers can be configured to solve unusual interference problems that exist by supplying them with "multiple window" bandpass preselectors. This protects receiver frequencies above and below transmit frequencies. Systems of this type must be evaluated on an individual basis by our Sales Engineering Department.

The standard preselectors provided with cataloged receiver multicouplers are appropriate for typical applications. If your specific application requires a different "front end" please review the various filter products found on catalog pages 213-224 or contact our Sales Engineering Department. Some of the more popular combline filters used for cellular and trunking can be found in Table 1.

CFX FILTER FILTER	FO	BW	APPLICATION
CFX811-6	811	13	Trunking
CFX813-6	813.5	15	Trunking
CFX815-6M	815	18	Trunking
CFX835-6	830 or 840	14	Cellular
CFX835-6N	830 or 840	10	Cellular
CFX835-6W	835	20	Cellular
CFX836-6N	835.25	22.5	Cellular
CFX836-6W	835.5	25	Cellular
CFX859-6	856 or 861	10	Trunking
CFX880-6N	875 or 885	10	Cellular
CFX880-6W	880	20	Cellular
CFX899-6	899	6	Trunking
CFX910-6	910	13	TACS

Table 1

The Amplifier

Because a receiver multicoupler is usually placed in a relatively high RF environment, it must be as resistant as possible to the effects of off-frequency signals which may be of high amplitude. In general, the higher the third order intercept point, the more capable the amplifier is of handling strong signals without overloading the receiver.

Since the amplifiers used in multicouplers usually have more gain to drive receiver outputs than is required, an attenuator is placed between the amplifier and the divider to keep the receiver output ports at approximately a 0 to 4 dB gain level. Excessive gain at the output ports is undesirable since it can lead to receiver overload.

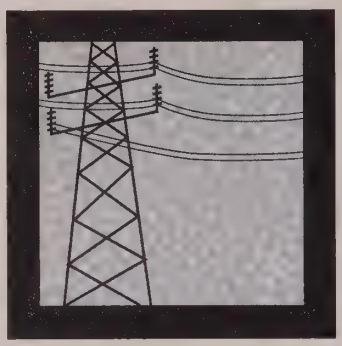
Some system designers favor GaAs FET amplifiers in today's receiver multicouplers. GaAs FET's can produce higher gains with lower noise than their counterparts.

The Power Dividers

Power dividers, or splitters, are based on hybrid coupler technology. These broadband devices require no tuning and "split" the received signal from the output of the amplifier to the individual receiver ports. A divider typically provides 25 dB or more isolation between each receiver port to minimize any possible interaction. However, any unused ports should be terminated with a 50 Ohm load (AL001) to insure isolation.

The typical divider is a four port device which distributes one input signal to four outputs with an insertion loss of about 7 dB per port. If more than four outputs are required, multiport integrated dividers are available. The amplifier in the multicoupler is designed with enough gain to offset the loss in the dividers. This format allows for easy field expandibility.

The Power Supply



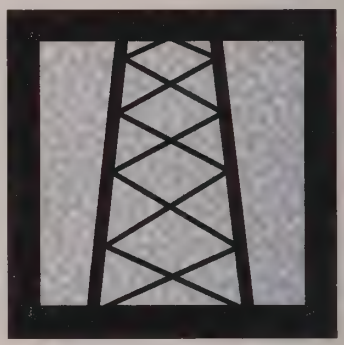
A power supply is required to drive the multicoupler's amplifier. Celwave has a full range of power supplies available for 120 VAC, 240 VAC, 50 Hz, 60 Hz and 28 VDC sources as standard. Optional power supplies for alternate sources or "trickle charge" supplies for battery back-up systems are available. All units are standard with built in surge protection to shield against lightning induced charges.

Tower Mounted Units and Surges

Where the RF noise level permits, many systems today incorporate tower mounted preamplifiers to compensate for downline coax loss and improve receiver sensitivity.

Many system operators are concerned about the susceptibility of lightning damage to these tower mounted units. Celwave offers the ultimate in lightning protection with our standard models.

The antenna mounted portion of the system contains a D.C. blocking device and a gaseous discharge type impulse suppressor. In addition to this gaseous device, there are two levels of MOV (Metal Oxide Varistor) protection devices in the D.C. block and a Transorb device in the amplifier enclosure, all intended to suppress lightning induced surges. The D.C. blocking device also incorporates a high-pass filter with a 300 MHz cut-off to suppress the A.C. components of the surge. The signals leaving the antenna mounted box travel down the coaxial cable linking the antenna box to the station and the D.C. travels up the cable to power the low noise amplifier in the box. Signal energy entering the station encounters exactly the same lightning protection devices as are installed upstairs. The station mounted gaseous tube device is mounted where the cable enters the station. From there the signals enter the D.C. block where surge components are suppressed by the two MOV's. The A.C. components are suppressed by the high pass filter. Additional suppressors in the form of Transorbs furnish further protection for both the station mounted amplifier and power supply. The power supply has MOV surge suppressors on the 117 volt line side of the power supply to protect against A.C. line induced surges.



Receiver Multicouplers

66-512 MHz

RMC070 Series*	66-88 MHz
RMC150 Series*	136-174 MHz
RMC460 Series*	406-512 MHz

***Exact frequencies and power source must be specified.**

Designed for use in the most demanding environments, this Celwave series couples several receivers to a single antenna. They each feature a low noise amplifier with outstanding immunity to intermodulation and come complete with power supply, amplifier and compact preselector filter.

These receiver multicoupler packages are easily field expandable in increments of four channels in a matter of minutes using only a Phillips head screwdriver. When expanded in excess of 32 channels, two rack trays requiring a total of seven inches vertical rack space are used for mounting.

Standard power supplies accommodate 120 VAC, 240 VAC, 60 Hz, 50 Hz, 12 VDC or 28 VDC sources. Optional power supplies for other sources are available. Please specify power requirements when ordering. Customized preselector configurations should be discussed with our Customer Service Department. Tower mounted amplifier packages are available for RMC460 Series.

It is recommended that unused divider ports be terminated with an AL001 load resistor.

• **Modular**	Easily expandable in the field.
• **Compact**	Minimizes rack space requirements.

Ordering Information: To order an RMC specify—

RMC460-4(24V)

1. Frequency
2. No. of Ports 4 to 64
3. Power Source-
   12 VDC
   24 VDC (24-28)
   120 VAC
   220 VAC (220-240)

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

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Receiver Multicouplers

RMC070 SERIES

ELECTRICAL SPECIFICATIONS	RMC070-4*	RMC070-8*	RMC070-12*	RMC070-16*
Frequency Range - MHz**	66-88	66-88	66-88	66-88
Bandwidth, Standard Available - MHz	1.0	1.0	1.0	1.0
Isolation - dB Between Ports	25 typical	25 typical	25 typical	25 typical
Noise Figure, Total Including Filter - dB	7.9	7.9	7.9	7.9
3rd Order Intercept Point - dBm	35	35	35	35
System Gain, Min. - dB	1.0	-0.5	-0.5	-0.5
Power Required	120 VAC, 240 VAC, 50 Hz, 60 Hz, 12 VDC, 28 VDC, Maximum Power Consumption 3.0W			

MECHANICAL SPECIFICATIONS	RMC070-4	RMC070-8	RMC070-12	RMC070-16
Dimensions - in. (mm)	Supplied on 19 (483) Rack Tray, 3-1/2 (89) High, 10 (254) Deep			
Connector - Ant. Input	N-female	N-female	N-female	N-female
Connector - Rx Outputs	BNC female	BNC female	BNC female	BNC female
Weight - lbs. (kg)	9.3 (4.2)	10.2 (4.6)	10.7 (4.9)	11.2 (5.1)

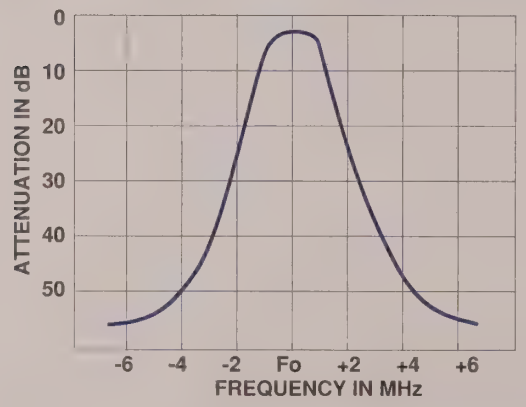
RMC150 SERIES

ELECTRICAL SPECIFICATIONS	RMC150-4*	RMC150-8*	RMC150-12*	RMC150-16*
Frequency Range - MHz**	136-174	136-174	136-174	136-174
Bandwidth, Standard Available - MHz	1.5	1.5	1.5	1.5
Isolation - dB Between Ports	25 typical	25 typical	25 typical	25 typical
Noise Figure, Total Including Filter - dB	7.7	7.7	7.7	7.7
3rd Order Intercept Point - dBm	35	35	35	35
System Gain, Min. - dB	1.0	-0.5	-0.5	-0.5
Power Required	120 VAC, 240 VAC, 50 Hz, 60 Hz, 12 VDC, 28 VDC, Maximum Power Consumption 3.0W			

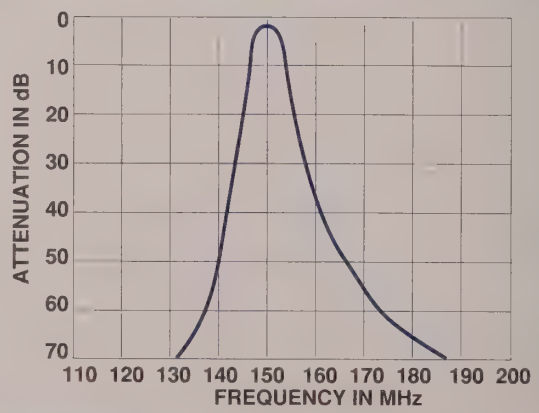
MECHANICAL SPECIFICATIONS	RMC150-4	RMC150-8	RMC150-12	RMC150-16
Dimensions - in. (mm)	Supplied on 19 (483) Rack Tray, 3-1/2 (89) High, 10 (254) Deep			
Connector - Ant. Input	N-female	N-female	N-female	N-female
Connector - Rx Outputs	BNC female	BNC female	BNC female	BNC female
Weight - lbs. (kg)	8.4 (3.8)	9.3 (4.2)	9.8 (4.5)	10.3 (4.7)

*Field expandable for up to 64 outputs in increments of four.
**Exact frequencies must be specified.

RMC070 SERIES
INPUT FILTER RESPONSE CURVE (Typical)



RMC150 SERIES
INPUT FILTER RESPONSE CURVE (Typical)



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Receiver Multicouplers

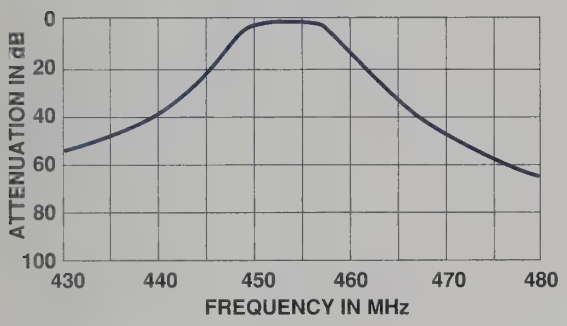
RMC460 SERIES

ELECTRICAL SPECIFICATIONS	RMC460-4*	RMC460-8*	RMC460-12*	RMC460-16*
Frequency Range - MHz	406-512	406-512	406-512	406-512
Bandwidth, Standard Available - MHz	6	6	6	6
Isolation - dB Between Ports	25 typical	25 typical	25 typical	25 typical
Noise Figure, Total Including Filter - dB	5.5	5.5	5.5	5.5
3rd Order Intercept Point - dBm	+36	+36	+36	+36
System Gain, Min. - dB	2	1	1	1
Power Required	120 VAC, 240 VAC, 50 Hz, 60 Hz, 12 VDC, 28 VDC, Maximum Power Consumption 6W			

MECHANICAL SPECIFICATIONS	RMC460-4	RMC460-8	RMC460-12	RMC460-16
Dimensions - in. (mm)	Supplied on 19 (483) Rack Tray, 3-1/2 (89) High, 10 (254) Deep			
Connector - Ant. Input	N-female	N-female	N-female	N-female
Connector - Rx Outputs	BNC female	BNC female	BNC female	BNC female
Weight - lbs. (kg)	8.4 (3.8)	9.3 (4.2)	9.8 (4.5)	10.3 (4.7)

*Field expandable for up to 64 outputs in increments of four.

RMC460 SERIES
INPUT FILTER RESPONSE CURVE
(Typical)



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Cellular Receiver Multicouplers

824-849 MHz

RMC836-32N24V	**Non-Wireline, 6-pole**
RMC836-32N24V-8	**Non-Wireline, 8-pole**
RMC842-32W24V	**Wireline, 6-pole**
RMC842-32W24V-8	**Wireline, 8-pole**

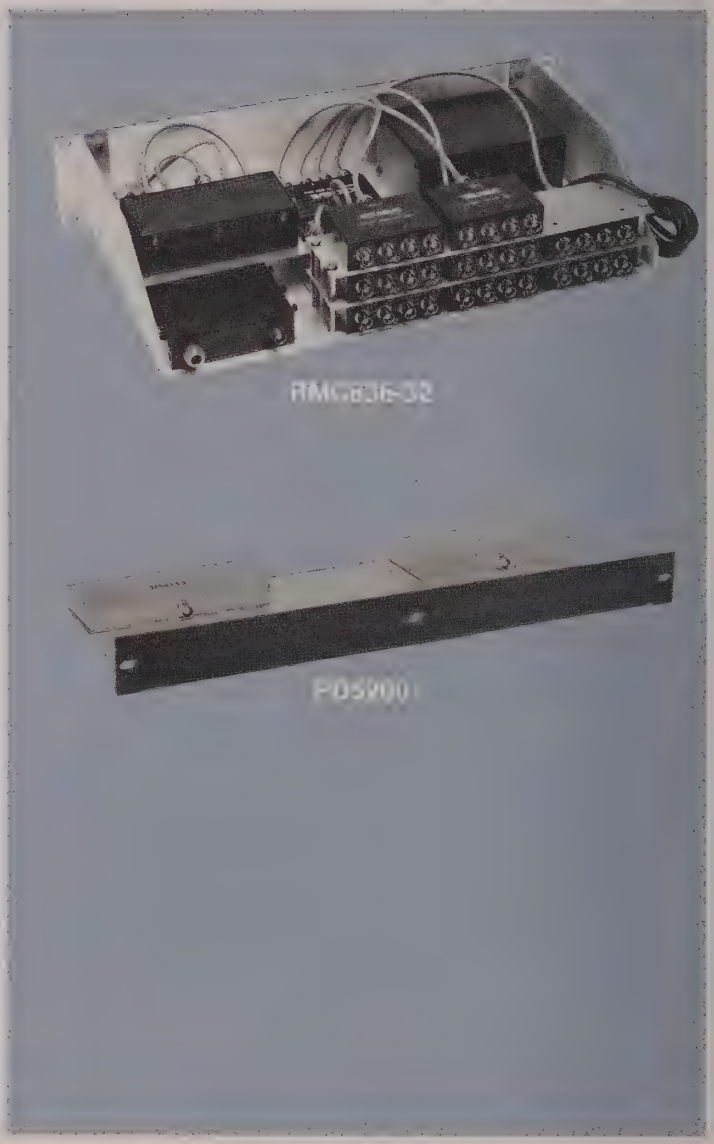
This series of high performance receiver multicouplers has been specially designed for expanded spectrum cellular systems. They are ideal for use where transmission runs do not exceed 300 feet. They can also be used with other Celwave preselector filters for increased selectivity and to minimize interference from adjacent cellular, high power SMR or dedicated channel users. Our 32 channel unit is the most widely used but 4 to 64 channel versions are available.

All 6 and 8-pole wireline and non-wireline models feature 6 and 8-pole preselector filters respectively. Eight pole versions provide improved system performance and greater selectivity. The front panels of all units have a fuse and LED display to indicate on/off status. It is recommended that all unused divider ports be terminated with an AL001 one Watt termination.

• **Low noise**	Improves system/carrier interference levels.
• **Wireline or non-wireline**	Minimizes interference from adjacent carriers.
• **High performance amplifiers**	Assures better system reliability.
• **High gain**	Improves better system reception.
• **Small size**	Minimizes space requirements.

PD5200 Receiver Distribution Tray

Facilitates the cabling of receivers with individual equipment racks. The tray can accomodate up to 16 receivers with only 1-3/4 inches of vertical rack space.



Ordering Information:
To order a Cellular Receiver Multicoupler specify—

RMC842-32W 24V-8

1. Frequency (center)
842 MHz - Wireline
836 MHz - Non-Wireline

2. No. of Ports - 12, 24 or 32

3. Band
W - Wireline
N - Non-Wireline

4.Power Source
28 VDC

5. No Poles (Filter)
Blank - 6 Pole
8 - 8 Pole

Note: These Receiver Multicouplers are painted brown. Black paint is a no cost option.

CELWAVE RFS
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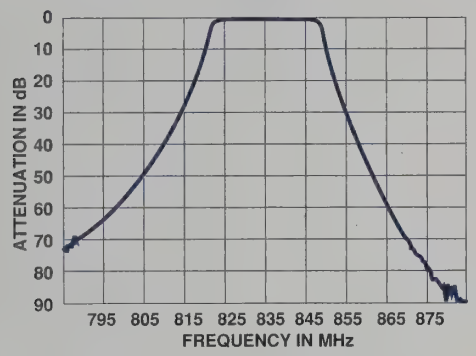
Cellular Receiver Multicouplers

ELECTRICAL SPECIFICATIONS	RMC836-32N2AV	RMC836-32N24V-8	RMC842-32W24V	RMC842-32W24V-8
Frequency Range - MHz	824-846.5	824-846.5	835-849	835-849
Bandwidth - MHz	22.5	22.5	14	14
Noise Figure-Total Including Filter - dB	4.5	4.8	4.5	4.7
3rd Order Intercept Point - dBm	+34	+34	+34	+34
System Gain Max. - dB**	10	10	10	10
Power Required - VDC (Maximum Power Consumption 6W)	28	28	28	28

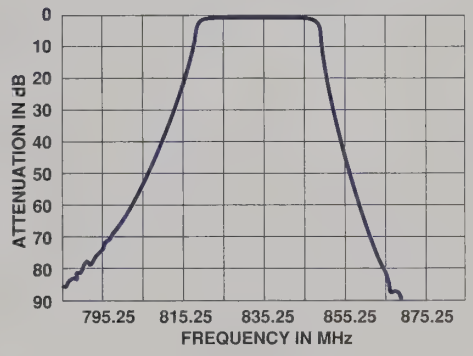
**6 dB Attenuator Removed

MECHANICAL SPECIFICATIONS	RMC836-32N2AV	RMC836-32N24V-8	RMC842-32W24V	RMC842-32W24V-8
Dimensions - in. (mm)	Supplied on 19 in. (483 mm) EIA Rack Tray 3-1/2 in. (89 mm) High, 12 in. (254 mm) Deep			
Connector - Ant. Input	N-female	N-female	N-female	N-female
Connector - Rx Output	BNC female	BNC female	BNC female	BNC female
Weight - lbs. (kg)	12.2 (5.5)	12.7 (5.72)	12.2 (5.5)	12.7 (5.72)

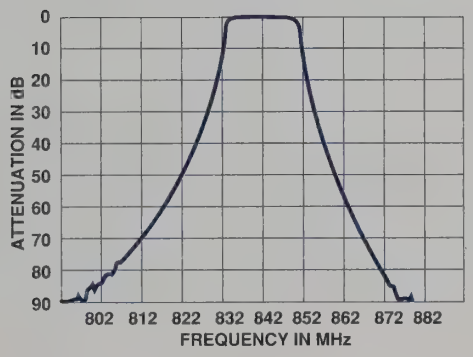
RMC836-6N
INPUT FILTER RESPONSE CURVE



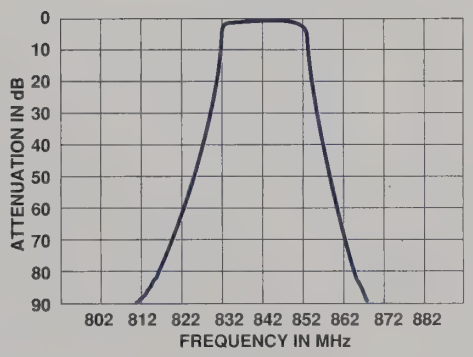
RMC836-8N
INPUT FILTER RESPONSE CURVE



RMC842-6
INPUT FILTER RESPONSE CURVE



RMC842-8
INPUT FILTER RESPONSE CURVE



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Tower Mounted Cellular Receiver Multicouplers

824-849 MHz

RMC836-16K*
RMC842-16K*
***Exact frequencies must be specified.**

These tower top receiver multicouplers are designed for both wide area MSA and RSA applications. They are ideal for transmission line runs in excess of 300 feet and provide exceptional balance between "talkback" and "talkout" so essential to wide area coverage. All of Celwave's tower top receiver multicouplers contain a high dynamic range redundant amplifier in the tower box and single stage amplifier in the base unit. Both low noise, high gain amplifiers are protected by a high current Zener diode and other forms of field proven transient protection to minimize failure due to lightning strikes. Available in 8 to 64 channel capacity.

• **Low noise**	Improves system carrier/ interference level.
• **High gain**	Improves total system reception.
• **Wireline or non-wireline preselector**	Reduces interference in areas where two carriers are located.
• **Redundant amplifiers**	Assures better overall system reliability.
• **Lightning protected**	Dependable system operation.

PD5200 Receiver Distribution Tray

Facilitates the cabling of receivers with individual equipment racks. The tray can accomodate up to 16 receivers with only 1-3/4 inches of vertical rack space.

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

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Tower Mounted Cellular Receiver Multicouplers

ELECTRICAL SPECIFICATIONS	RMC836-16K	RMC836C-16K	RMC842-16K
Frequency Range - MHz	824-846.5	824-849	835-849
Bandwidth - MHz	22.5	25	14
Noise Figure, Total Including Filter - dB	4.8	4.8	4.8
3rd Order Intercept Point - dBm	+34	+34	+34
Amplifier Gain (Tower Box) - dB	26.5	26.5	26.5
Amplifier Gain (Base Tray) - dB	19.5	19.5	19.5
System Gain, Excluding Cable Loss - dB Min.*	23.4	23.1	23.6
Amplifier Network	Dual Stage, Redundant Tower		
Power Required	120, or 220 VAC, 50 Hz, 60 Hz or 28 VDC; Max. Power Consumption 15W		

*3 dB Attenuator removed.

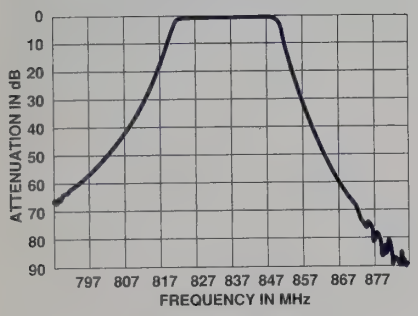
MECHANICAL SPECIFICATIONS		RMC836-16K	RMC836C-16K	RMC842-16K
Dimensions - in. (mm) W x H x D	Tower Box		10 x 12 x 5 (254 x 304.8 x 127)	
	Base Tray		19 x 3-1/2 x 10 (483 x 89 x 254)	
Connectors (Tower Box)	Input	N-female	N-female	N-female
	Output	N-female	N-female	N-female
Connectors (Base Tray)	Input	N-female	N-female	N-female
	Output	BNC female	BNC female	BNC female
Weight - lbs. (kg)	Tower Box	16 (7.2)	16 (7.2)	16 (7.2)
	Base Tray	19 (8.55)	19 (8.55)	19 (8.55)

Ordering Information: To order a Tower Top RMC specify—

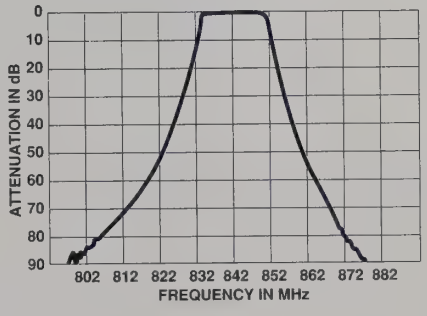
RMC836-16K (24V)

1. Frequency (Center)
   842 MHz - Wireline
   836 MHz - Non-Wireline
2. No. of ports - Specify 8 to 64
3. A for single stage; K for dual stage
4. Power Source-
   12 VDC
   24 VDC (24-28)
   120 VAC
   220 VAC (220-240)

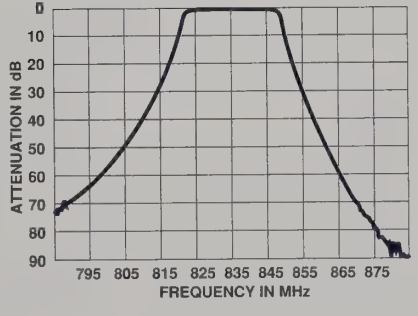
RMC836-16K INPUT FILTER RESPONSE CURVE



RMC842-16K INPUT FILTER RESPONSE CURVE



RMC836C-16K INPUT FILTER RESPONSE CURVE



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Tower Mounted Receiver Multicouplers

806-1000 MHz

RMC800-12A*, 24A*
RMC800-12K*, 24K*
RMC900-10K*, 20K*
*** Exact frequencies must be specified.**

These Celwave units are receiver multicouplers used in trunking systems requiring the ultimate in 800/900 MHz performance.

All of the Celwave tower mounted multicouplers consist of a base mounted unit which contains a power supply with a high dynamic range amplifier and power dividers which distribute the signals to the receivers. A separate tower mounted weather resistant enclosure houses a high selectivity input filter coupled to a low-noise, high dynamic range amplifier. These multicoupler systems include the latest in field-proven transient protection to minimize failure due to lightning. Each amplifier is protected by a high-current Zener diode. The power for the top amplifier is coupled to the transmission line with DC block devices which incorporate two metal oxide varistors and a high pass filter to suppress the AC components of a surge. Gas tube impulse suppressors are installed in the tower mounted enclosure where the transmission line enters and an additional impulse suppressor is supplied to be mounted where the transmission line enters the station. Finally, surge suppressors protect both sides of the AC line input.

The RMC800-12A and RMC800-24A are designed for 12 or 24 outputs respectively. A single stage, low noise tower mounted amplifier provides net system gains useful in many installations where the transmission line loss is 5 dB or less.

The RMC800-12K, RMC800-24K, RMC900-10K and RMC900-20K are designed for 12, 24, 10 or 20 outputs. A dual stage, low noise, high gain tower mounted amplifier is hybrid coupled, greatly reducing the possibility of down time due to device failure.

A 500 mA meter mounted on the station chassis indicates the current drain of the tower mounted amplifier, providing a good indication of its proper operation.

All models are available with optional switching that allows selection of a main or back-up amplifier in the tower box.

• **Low loss**	Maximizes receiver sensitivity.
• **Weather resistant enclosure**	Ensures system reliability in hostile environments.
• **Built-in surge protection**	Minimizes failure due to lightning.
• **Low noise ratio**	Maximizes system performance.

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Tower Mounted Receiver Multicouplers

ELECTRICAL SPECIFICATIONS	RMC800-12A	RMC800-24A	RMC800-12K	RMC800-24K	RMC900-10K*	RMC900-20K
Frequency Range - MHz	806-824	806-824	806-824	806-824	890-915	890-915
Bandwidth, Standard Available - MHz	15	15	15	15	6	6
System Noise Figure Excluding Cable Loss - dB	5.5	5.5	4.5	4.5	4.5	4.5
3rd Order Intercept Point - dBm	+34	+34	+34	+34	34.5	34.5
Amplifier Gain (Tower Box) - dB	14	14	26.5	26.5	26.5	26.5
Amplifier Gain (Base Tray) - dB	19.5	19.5	19.5	19.5	19.5	19.5
System Gain, Excluding Cable Loss - dB**	17.9	14.2	30.4	26.7	31.2	27.5
Amplifier Networks	Single Stage, Tower and Base		Dual Stage, Redundant Tower		Dual Stage, Redundant Tower	
Power Required (Specify on Order)	120 Vac or 240 Vac, 50 Hz, 60 Hz or 28 VDC; Maximum Power Consumption 15W					

*Field expandable up to 20 outputs in increments of ten.
**3 dB Attenuator removed.

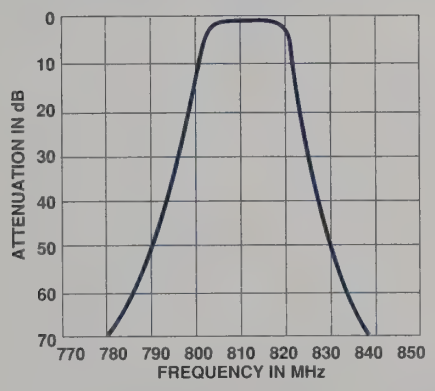
MECHANICAL SPECIFICATIONS	RMC800-12A	RMC800-24A	RMC800-12K	RMC800-24K	RMC900-10K	RMC900-20K
Dimensions - in. (mm) W x H x D	Tower Box: 10 x 12 x 5 (254 x 305 x 127) E.I.A. Rack Tray: 19 x 3-1/2 x 10 (483 x 89 x 254)					
Connectors (Tower Box)	Input: N-female Output: N-female					
Connectors (Base Tray)	Input: N-female Output: BNC female					
Weight of Tower Box - lbs. (kg)	19 (8.6)	19 (8.6)	19 (8.6)	19 (8.6)	19 (8.6)	19 (8.6)
Weight Base Tray - lbs. (kg)	8.5 (3.8)	10.5 (4.8)	9.3 (4.2)	11.7 (5.3)	9.1 (4.1)	11.7 (5.2)

Ordering Information: To order a Tower Top RMC specify—

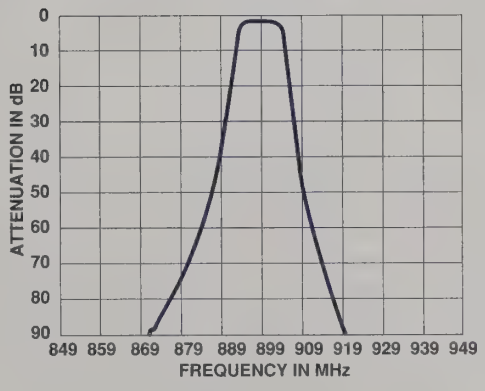
RMC800-12A (24V)

1. Frequency
2. No. of ports-12, 24 for 800 MHz models; 8 for 842 MHz models; 10, 20 for 900 MHz models
3. A for single stage; K for dual stage
4. Power Source-
   12 VDC
   24 VDC (24-28)
   120 VAC
   220 VAC (220-240)

RMC800 SERIES (Typical)
INPUT FILTER RESPONSE CURVE



RMC900 SERIES (Typical)
INPUT FILTER RESPONSE CURVE



CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

Route 79, Marlboro, NJ 07746 • Tel. (908)462-1880 • (800)321-4700 • FAX (908)462-6919

Receiver Multicouplers

806-1000 MHz

RMC800 Series* RMC900 Series* 4 to 64 Channel

***Exact frequencies and power source must be specified.**

These Celwave units feature low noise amplifiers with outstanding immunity to intermodulation and come complete with power supply, amplifier and compact preselector filter. They are designed for use in the most demanding environments and can combine multiple receivers to a single antenna. The RMC900 Series was specially developed to prevent interference from cellular transmit bands at co-located sites.

Non-Expandable Models

The RMC800-4N and RMC800-8N are four and eight output models offering economical solutions for systems with a limited number of channels.

Expandable Models

The RMC800 series are easily expanded in the field to up to 64 outputs using nothing but a screwdriver. Expansion kits are available and include power divider, cable assembly and all necessary hardware. A 6 dB attenuator pad is included between amplifier stages and can be readily removed should increased gain be required. Optional amplifiers are available to meet special requirements. *Expansion Kits and amplifiers are listed on page 242.*

Standard power supplies accommodate 120 VAC, 240 VAC, 60 Hz, 50 Hz, 12 VDC or 28 VDC. Optional power supplies for other sources are available. Please specify power requirements when ordering. It is recommended that all unused ports be terminated with an AL001 one Watt load termination. Celwave will not guarantee system specifications if unused ports are not terminated.

• **High selectivity low noise**	Maximizes system performance.
• **Modular**	Easily expandable in the field.
• **Compact**	Minimizes rack space requirements.

Ordering Information: To order an RMC specify—

Expandable Models

RMC800-4(24V)

1. Frequency
2. No Ports 4 to 64
3. Power Source-
   12 VDC
   24 VDC (24-28)
   120 VAC
   220 VAC (220-240)

Non Expandable Models

Available for 4 and 8 port models only. Specify RMC800-4N or RMC800-8N.

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Receiver Multicouplers

RMC800 SERIES

ELECTRICAL SPECIFICATIONS	RMC800-4N	RMC800-8N
Frequency Range - MHz***	806-824	806-824
Bandwidth, Standard Available - MHz	15	15
Noise Figure, Total Including Filter - dB	4.0	4.0
3rd Order Intercept Point - dBm	+30	+30
System Gain, Min. - dB	5	2
Power Required	120 VAC, 240 VAC, 50 Hz, 60 Hz, 28 VDC; Maximum Power Consumption 1W	

***Exact frequencies must be specified.

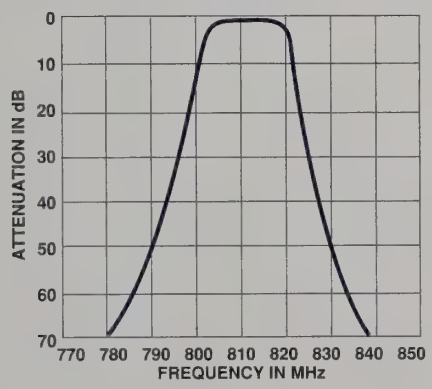
MECHANICAL SPECIFICATIONS	RMC800-4N	RMC800-8N
Dimensions - in. (mm)	Supplied on 19 (483) E.I.A. Rack Tray 3-1/2 (89) High, 10 (254) Deep	
Connector - Ant. Input	N-female	N-female
Connector - Rx Output	BNC female	BNC female
Weight - lbs. (kg)	8.2 (3.7)	9.2 (4.2)

ELECTRICAL SPECIFICATIONS	RMC800-4*	RMC800-8*	RMC800-12*	RMC800-16*	RMC800-20*
Frequency Range - MHz***	806-824	806-824	806-824	806-824	806-824
Bandwidth, Standard Available - MHz	15	15	15	15	15
Noise Figure, Total Including Filter - dB	4.5	4.5	4.5	4.5	4.5
3rd Order Intercept Point - dBm	+34	+34	+34	+34	+34
System Gain, Max. - dB**	12	12	12	12	10
Power Required	120 VAC, 240 VAC, 50 Hz, 60 Hz, 12 VDC, 28 VDC; Maximum Power Consumption 6W				

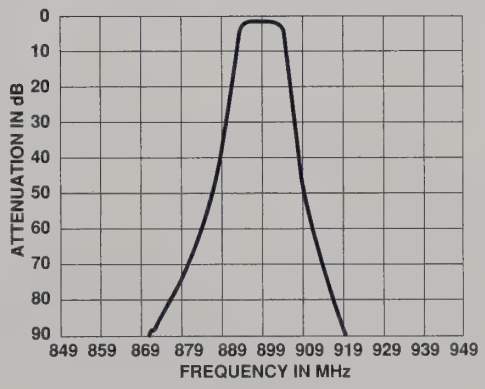
*Field expandable up to 64 outputs in increments of four.
**6 dB Attenautor removed.
***Exact frequencies must be specified.

MECHANICAL SPECIFICATIONS	RMC800-4	RMC800-8	RMC800-12	RMC800-16	RMC800-20
Dimensions - in. (mm)	Supplied on 19 (483) E.I.A. Rack Tray 3-1/2 (89) High, 10 (254) Deep				
Connector - Ant. Input	N-female	N-female	N-female	N-female	N-female
Connector - Rx Ouput	BNC female	BNC female	BNC female	BNC female	BNC female
Weight - lbs. (kg)	8.2 (3.7)	9.2 (4.2)	9.6 (4.4)	10.1 (4.6)	10.7 (4.9)

RMC800 SERIES (Typical)
INPUT FILTER RESPONSE CURVE



RMC900 SERIES (Typical)
INPUT FILTER RESPONSE CURVE



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Receiver Multicouplers

RMC800 SERIES

ELECTRICAL SPECIFICATIONS	RMC800-24*	RMC800-28*	RMC800-32*	RMC800-64
Frequency Range - MHz***	806-824	806-824	806-824	806-824
Bandwidth, Standard Available - MHz	15	15	15	15
Noise Figure, Total Including Fiter - dB	4.5	4.5	4.5	4.5
3rd Order Intercept Point - dBm	+34	+34	+34	+34
System Gain, Max. - dB**	10	10	10	7
Power Required	120 VAC, 240 VAC, 50 Hz, 60 Hz, 12 VDC, 28 VDC; Maximun Power Consumption 6W			

*Field expandable up to 64 outputs in increments of four.
**6 dB Attenautor removed.
***Exact frequencies must be specified.

MECHANICAL SPECIFICATIONS	RMC800-24	RMC800-28	RMC800-32	RMC800-64†
Dimensions† - in. (mm)	Supplied on 19 (483) E.I.A. Rack Tray 3-1/2 (89) High, 10 (254) Deep			
Connector - Ant. Input	N-female	N-female	N-female	N-female
Connector - Rx Ouput	BNC female	BNC female	BNC female	BNC female
Weight - lbs. (kg)	11.2 (5.1)	11.7 (5.3)	12.2 (5.5)	17.2 (7.8)

†64 Channel versions require two trays, total 7 inch vertical rack space.

RMC900 SERIES

ELECTRICAL SPECIFICATIONS	RMC900-10*	RMC900-20
Frequency Range - MHz***	890-915	890-915
Bandwidth, Standard Available - MHz	6	6
Noise Figure, Total Including Fiter - dB	4.9	4.9
3rd Order Intercept Point - dBm	+34	+34
System Gain - dB**	13	9.6
Power Required	110 VAC, 220 VAC, 50 Hz, 60 Hz, 28 VDC; Maximun Power Consumption 6W	

*Field expandable up to 64 outputs in increments of ten.
**3 dB Attenautor removed.
***Exact frequencies must be specified.

MECHANICAL SPECIFICATIONS	RMC900-10	RMC900-20
Dimensions - in. (mm)	Supplied on 19 (483) E.I.A. Rack Tray 3-1/2 (89) High, 10 (254) Deep	
Connector - Ant. Input	N-female	N-female
Connector - Rx Ouput	BNC female	BNC female
Weight - lbs. (kg)	8.5 (3.9)	11.1 (5.0)

Receiver Multicoupler Expansion Kits and Replacement Parts

Amplifiers

PD656130 Single stage, high dynamic range amplifier which is a direct replacement for the unit used in the RMC070-4 through RMC070-16.

PD640000 Single stage, high dynamic range amplifier which is a direct replacement for the unit used in the RMC150-4 through RMC150-16.

PD656140 Single stage, high dynamic range amplifier which is a direct replacement for the unit used in the RMC460-4 through RMC460-16.

PD640060 Single stage, low noise, high dynamic range amplifier which is a direct replacement for the amplifier used in models RMC800-4N and RMC800-8N multicouplers; also a direct replacement for the tower mounted amplifier used in the RMC800-12A, RMC800-24A.

PD640080 Dual stage, low noise, high dynamic range amplifier replacement part for expandable series multicouplers RMC800-4 through RMC800-64.

PD640290 Dual stage, low noise, high dynamic range hybrid-coupled amplifier which is a direct replacement for tower mounted units used in the RMC800-12K and RMC800-24K.

PD640240 Single stage, high dynamic range amplifier which is a direct replacement for the station mounted unit used in the RMC800-12A, RMC800-24A.

Power Supplies

PD506230 Replacement power supply for 120 VAC power source.

PD506260 Replacement power supply for 240 VAC power source.

PD506270 Replacement power supply for 28 VDC power source.

PD506290 Special power supply to handle 120 VAC primary and 28 VDC backup (trickle charge) power sources.

Expansion Kits

All expansion kits are supplied complete with hardware and easy to follow instructions. The only tool required is a Phillips screwdriver. The instruction manuals which come with all multicouplers detail the expansion scheme. If further information is required, our Customer Service Department is ready to assist. The basic expansion kits follow:

Four-way power divider including interconnecting cable assembly and mounting hardware.

PD656520 20-512 MHz

PD656210 806-1000 MHz

Eight-way power divider including interconnecting cable assembly and mounting hardware.

PD656650 20-512 MHz

PD656220 806-1000 MHz

PD656270 Bracket assembly for mounting divider, includes bracket, spacers and mounting hardware.

Expansion Kit Table

	20-512 MHz	806-1000 MHz
To expand from 4 channels to 8 channels order part	PD656520 (2 required)	PD656210
To expand from 8 channels to 12 channels order part	PD656520	PD656210
To expand from 12 channels to 16 channels order part(s)	PD656520 & PD656270 (Bracket Assembly)	PD656210 & PD656270 (Bracket Assembly)

A second tray and two-way divider is required to expand beyond 32 channels. The expansion from 36 to 64 channels then follows the scheme outlined above.

Note: An AL001, one Watt load, should be used to terminate all unused divider ports.

Keeping the Farallone Patrol off the rocks.

"Roger, Puffin, we're looking good here. Seas favorable with three-foot swells. Suggest you land at Mussel Flat."

The message originates from the rugged shores of the Farallone Islands, the largest sea bird and marine mammal sanctuary in the United States.

It's received loud and clear by the Puffin's skipper, one of many boat owners who use their pleasure crafts to ferry supplies and personnel to biologists stationed 28 miles off California's coast.

Reports of weather conditions weren't always so dependable for the volunteers of the Farallone Patrol. Until recently, the island's old, overcrowded VHF channel often made it impossible to complete any message without interruption.

A new, four channel VHF base station using six Celwave antenna systems has made that problem a thing of the past, and the Farallone Patrol no longer risks becoming an endangered species.

Celwave has designed and equipped antenna systems to meet all kinds of needs all over the world. Sometime soon, we could do the same for you.

CELWAVE RFS

DIVISION OF RADIO FREQUENCY SYSTEMS

Let's talk about your future.

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Introduction to Transmitter Combining Techniques

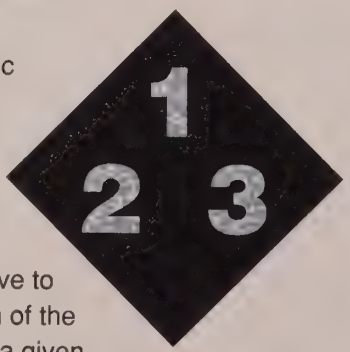
Why Combine Transmitters?

The need to combine two or more transmitters into one antenna has grown tremendously due to increased radio usage and crowded transmission sites. Often the one time cost of a transmitter combiner can be quickly justified against the ongoing expenses of prime tower leasing charges.

A Celwave combiner serves several functions. First, it allows two or more transmitters to be combined into a single coax run and antenna effecting the economies cited above. Secondly, it provides isolation between the transmitters which have been combined. Finally, the combiner will provide filtering against intermodulation and potential interference.

The performance of Celwave combiners is documented. Each is supplied with an instruction manual and data sheet providing actual measured insertion loss and isolation figures for each channel. Don't settle for factory "typical" specifications which are seldom realized in the field. We believe in providing a complete documentation package with each unit to support installation and maintenance personnel.

Which Combiner to use?



There are three basic types of transmitter combiners, each having several significant advantages or disadvantages relative to the others. Selection of the proper combiner for a given application requires comparison of the system requirements against these features:

Cavity Type...

All-cavity type combiners are usually constructed of intercabled bandpass cavities. Isolation is accomplished from the resonant response curve of the cavities. In special cases, pass reject cavities may also be used to provide higher isolation or closer frequency spacing. The advantages of the all-cavity approach are: low cost, low insertion loss and configuration flexibility. Disadvantages include: limited channel capability, large size, a frequency change or change in the number of channels typically requires combiner redesign.

This combiner type is generally used when the frequency spacing between channels is very wide. Minimum spacing between channels for all-cavity types are:

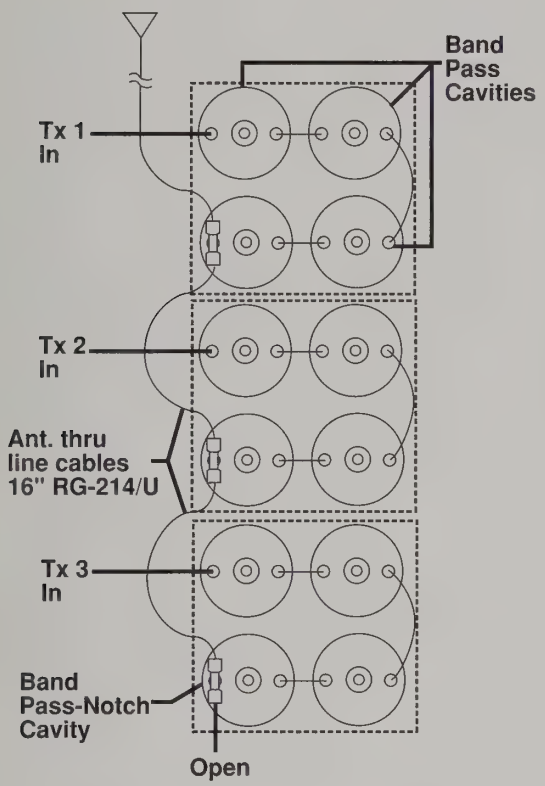
Channel Spacing	Operating Band
1 MHz	150 MHz
2 MHz	450 MHz
4 MHz	800 MHz

Because of the highly individual characteristics of this type combiner, Celwave does not attempt to catalog these items. Consultation with our Technical Sales Department and the cavity specifications found on catalog pages 173-183 will aid in combiner design. Technical Data Releases on the PD5092 (UHF) and PD5093 (VHF) models represent typical systems. Figure 1 illustrates a three channel PD5092 unit with three bandpass and one pass-reject cavity per channel.

Cavity Ferrite Type...

The most popular combiner type is the cavity ferrite combiner which is usually comprised of bandpass cavities with a ferrite isolator in each channel for transmitter intermodulation protection. Increased amounts of isolation can be provided by using dual or triple stage isolators as required. Cavity selectivity can be enhanced by using three-quarter wave or larger diameter cans.

Advantages of the cavity ferrite type combiner are high isolation and low insertion loss for moderately close channel spacing. In addition, these moderate



Typical 3 Channel Combiner

Figure 1

cost units are easily field expandable making them popular in trunking and cellular systems.

The biggest disadvantage of this combiner type is that they are not adequate for close channel spacing. Typical lower limits for channel spacing are:

Channel Spacing	Operating Band
100 KHz	70 MHz
75 KHz	150 MHz
150 KHz	450 MHz
250 KHz	800 MHz

Hybrid Ferrite Type...

If the channel spacings are too close for the cavity response curve to provide isolation, eliminating the use of all-cavity or cavity ferrite combiners, the Hybrid Ferrite type combiner is used. A hybrid coupler is the actual combining device, used in conjunction with an isolator and second harmonic filter in each channel. These combiners have no minimum separation specifications and can even be used to combine two transmitters operating on the same frequency.

A combiner of this type provides very high isolation between transmitters and also very good isolation between transmitters and antenna. Other advantages are compact size and easy expandability.

The major disadvantages to the hybrid ferrite combiner are its high insertion loss and relatively high cost.

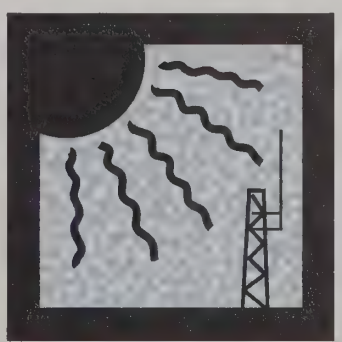
Avoiding Frequency Drift

The use of low loss cavity type combiners at the reduced channel separation spacings demanded by modern multi-channel installations requires that the cavities making up these combiners have high selectivity (high operating Q factor). Fairly small resonant frequency changes within cavities can cause significant isolation and insertion loss changes within the combiners, degrading system performance. The causes of such frequency "drift", and the extensive measures taken by Celwave to minimize it, are discussed in more detail on catalog page 173 under cavity construction.

The major benefits of Celwave stable cavity construction accrue to the operator of a Celwave combiner. All of our combiners are designed to be long-term maintenance free. No periodic tuning adjustments are required if operated within stated temperature and humidity environments.

System Accessories

A wide range of system accessories are available to enhance the performance of your Celwave combiner. Some of the more popular items are shown on catalog pages 297-299.



The Systems Cabinets, with key lock front and rear doors, provide protection and security

for your base equipment investment. These cabinets are also available with PD583050 Fan Top option to provide improved air flow and cooling for systems operating in high ambient temperatures or under high transmitter power. As discussed in the previous section "Frequency Drift" these factors can be critical for the optimum performance of your combining system.

Our Guardian Series Power Monitoring Panels meet the needs of system operators who desire ongoing measurements of forward and reflected power levels. These unique digital devices provide accurate measurement and will activate customer provided alarms.

The IT600 R.F. Sampler provides a convenient means of tuning the combiner for maximum power transfer using the transmitter. This observation port is installed between the isolator and load assembly in each combiner channel. Periodic maintenance of active combining systems can then be performed without turning off any channel except the one being checked or adjusted.

What About Customized Systems?

If your system requirements do not fall within general outlines given above, a customized combining system may be appropriate. Celwave Customer Service and Engineering personnel will assist you with your specialized requirements. Please be prepared to provide the following information:

1. Operating frequencies (if specific frequencies are unknown, provide minimum spacing between frequencies).
2. Transmitter power level (Watts).
3. Size limitations, if any.
4. Is future expansion planned? If so, how many channels and at what frequencies?
5. What other frequencies are operating at the same transmitter site? (Obtain all Tx and Rx for intermodulation considerations).
6. Mention minimum acceptable requirements for any specifications such as insertion loss or isolation.

Our proposal for your customized system will include an intermodulation analysis if required, a mechanical layout of the full antenna system including antenna spacing if appropriate, and an electrical diagram complete with specifications such as maximum insertion loss and minimum isolation provided by Celwave combining equipment.

Hybrid Couplers/Matching Networks

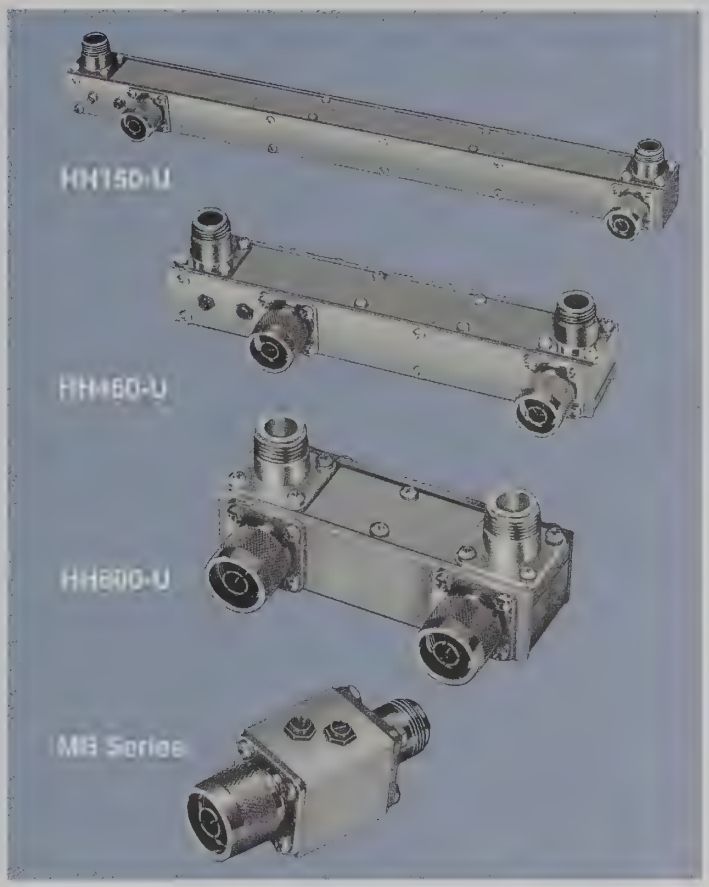
66-1000 MHz

Hybrid Couplers
HH Series
66-88 MHz, 136-174 MHz, 406-512 MHz, 806-1000 MHz

Matching Networks
MB Series
150-174 MHz, 406-512 MHz, 806-1000 MHz

The HH Series Hybrid Couplers are two-way power splitters that effectively isolate and combine two input signals and connect them to a common output. These units are usually used with ferrite isolators to make close-spaced, compact transmitter combiners. These couplers provide low insertion loss and high isolation between the ports. The 150 MHZ units are tunable; 460 MHz and 800 MHz units are broadband fix-tuned.

The MB Series Networks are designed to be used between a source and a load to insure maximum power transfer to the load for a mismatch up to 1.5:1. Typically, the MB Series would be used between a cavity combiner and an antenna.



ELECTRICAL SPECIFICATIONS	HH070-U	HH150-U	HH460-U	HH800-U	MB150	MB460	MB900
Frequency Range - MHz	66-88*	136-150** 150-174**	406-512	806-1000	150-174	406-512	806-1000
Isolation - Tx Port 1 to Tx Port 2 When Output Port Matched - dB	25	25	25	25	—	—	—
Insertion Loss, Max.	3.25	3.25	3.25	3.25	0.1	0.1	0.1
VSWR Max. Allowable, All Ports	1.25:1	1.25:1	1.25:1	1.25:1	—	—	—
VSWR, Max. Allowable, Mismatch	—	—	—	—	1.5:1	1.5:1	1.5:1
Power Input, Max. - Watts	350	350	300	300	350***	350***	350***

MECHANICAL SPECIFICATIONS	HH070-U	HH150-U	HH460-U	HH800-U	MB150	MB460	MB900
Dimensions, Excluding Connectors - in. (mm) H x L x W	1.0 x 14 x 1.4 (25 x 356 x 36)	1.0 x 14 x 1.4 (25 x 356 x 36)	1.0 x 7 x 1.4 (25 x 178 x 36)	1.0 x 4 x 1.4 (25 x 102 x 36)	1.0 x 2.65 x 1.0 (25 x 67 x 25)		
Connector, Ant. and Load Port	N-female	N-female	N-female	N-female	—	—	—
Connector, Input Ports	N-male	N-male	N-male	N-male	—	—	—
Connectors	—	—	—	—	N-male and N-female		
Weight - lbs. (kg)	1.5 (0.68)	1.5 (0.68)	0.8 (0.36)	0.6 (0.27)	0.2 (0.09)	0.2 (0.09)	0.2 (0.09)

*The HH070-U is not tunable over the entire band and is made to customer specified frequency.
**Specify frequency range.
***Single source; maximum RF peak voltage 250V.

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Hybrid Coupler Panels

66-1000 MHz

PBH Series and PCH Series
66-88 MHz, 136-174 MHz,
406-512 MHz, 806-1000 MHz

PHH Series
136-174 MHz, 406-512 MHz, 806-1000

The PBH Series consists of an HH Series Universal Hybrid mounted on a 3-1/2 inch rack panel with a 60 Watt load on the hybrid. These panels are used to expand the TBC and TBD two channel combiners to four channels.

The PCH Series consists of an HH Series Universal Hybrid mounted on 3-1/2 inch rack and incorporates a 150 Watt load. The PCH Series is used to expand the TCC and TCD Series two channel combiners to four channel combiners.

The PHH Series are similar to the PBH and PCH but incorporate a 300 Watt load on the hybrid and are mounted on a 5-1/2 inch rack tray. They are used to expand THC and THD Series two channel combiners to four channels.

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Hybrid Coupler Panels

ELECTRICAL SPECIFICATIONS	PBH070	PCH070	PBH150	PCH150	PHH150
Frequency Range - MHz	66-88*	66-88*	136-150** 150-174**	136-150** 150-174**	136-150** 150-174**
Isolation, Tx Port 1 to Tx Port 2 with Output Port Matched Load - dB	25	25	25	25	25
Insertion Loss, Max - dB	3.25	3.25	3.25	3.25	3.25
VSWR, Max. - All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1
VSWR, Max. Allowable on Output Port	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1
Power Input, Max. - Watts	350	350	350	350	350
Power Reflected, Max. Allowable - Watts	60	150	60	150	300

*The HH070-U is not tunable over the entire band and is made to the customers specified frequency.
**Specify frequency range.

MECHANICAL SPECIFICATIONS	PBH070	PCH070	PBH150	PCH150	PHH150
Dimensions - in. (mm) PBH and PCH Series PHH Series	19 (483) Wide Rack Panel, 3-1/2 (89) High, 5-7/8 (149) Deep 19 (483) Wide Rack Panel, 5-1/4 (133) High, 7 (178) Deep				
Connector - Antenna	N-female, Standard; N-male, Available				
Connectors - Input Ports	N-female, Standard; N-male, Available				
Weight - lbs. (kg)	3.6 (1.6)	5.6 (2.6)	3.6 (1.6)	5.6 (2.6)	10 (4.5)

ELECTRICAL SPECIFICATIONS	PBH460	PCH460	PHH460	PBH800	PCH800	PHH800
Frequency Range - MHz	406-512	406-512	406-512	806-1000	806-1000	806-1000
Isolation, Tx Port 1 to Tx Port 2 with Output Port Matched Load - dB	25	25	25	25	25	25
Insertion Loss, Max - dB	3.25	3.25	3.25	3.25	3.25	3.25
VSWR, Max. - All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1
VSWR, Max. Allowable on Output Port	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1
Power Input, Max. - Watts	300	300	300	300	300	300
Power Reflected, Max. Allowable - Watts	60	150	300	60	150	300

MECHANICAL SPECIFICATIONS	PBH460	PCH460	PHH460	PBH800	PCH800	PHH800
Dimensions - in. (mm) PBH and PCH Series PHH Series	19 (483) Wide Rack Panel, 3-1/2 (89) High, 5-7/8 (149) Deep 19 (483) Wide Rack Panel, 5-1/4 (133) High, 7 (178) Deep					
Connector - Antenna	N-female, Standard; N-male, Available					
Connectors - Input Ports	N-female, Standard; N-male, Available					
Weight - lbs. (kg)	2.9 (1.3)	4.9 (2.2)	9.5 (4.3)	2.7 (1.2)	4.7 (2.1)	9(4)

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Harmonic Filters

66-1000 MHz

PD1600*	**Low Pass**	150-174 MHz
PD1601*	**Low Pass**	450-512 MHz
AF Series*	**Tunable**	66-1000 MHz

***Exact frequencies must be specified.**

An isolator connected to the output of a transmitter should always have a harmonic filter between it and the antenna to attenuate undesired harmonics.

These filters are designed to reduce harmonic products that can cause interference problems.

The PD1600 and PD1601 low pass units are in-line devices which provide a minimum of 40 dB attenuation at the second and third harmonic.

The AF Series are tunable in-line devices designed to reject the second harmonic of the signal applied. They are smaller and lower in cost than conventional low pass filters, feature low loss and 40 dB minimum rejection.

• **Compact**	Can be connected directly to an isolator.
• **Low loss**	Maximizes system performance.
• **Supresses harmonic products**	Minimizes possible interference problems.

PD1600

AF Series

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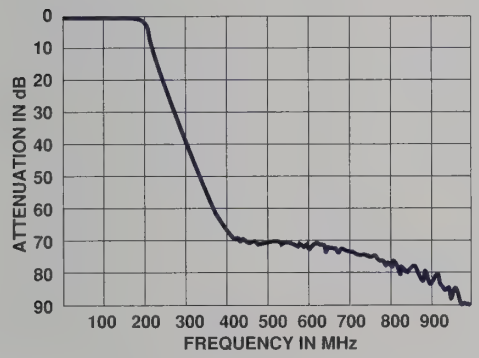
Harmonic Filters

ELECTRICAL SPECIFICATIONS	PD1600	PD1601	AF070-T	AF150-T	AF460-T	AF800-T
Frequency Range - MHz	150-174	450-512	66-88*	136-150 150-174	406-512	806-960
Insertion Loss - dB	0.25	0.25	0.1	0.1	0.1	0.1
Attenuation, Min. - dB	40	40	40**	40**	40**	40**
VSWR, Max.	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1
Continuous Power Input, Max. - Watts	250	150	350	350	350	350

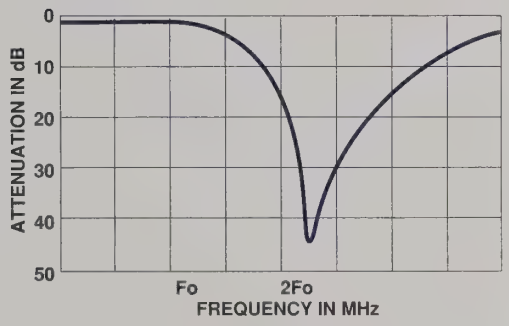
MECHANICAL SPECIFICATIONS	PD1600	PD1601	AF070-T	AF150-T	AF460-T	AF800-T
Dimensions, Excluding Connectors - in. (mm) H x W x D	1-1/4 x 1-3/8 x 2-1/4 (31.8 x 34.9 x 57.2)		1 x 2-1/4 x 1 (25 x 61 x 25)		1 x 2-1/4 x 1 (25 x 61 x 25)	
Connectors	N-female — N-male		N-female — N-male		N-female — N-male	
Weight - lbs. (kg)	0.25 (0.11)	0.25 (0.11)	0.115 (0.07)	0.115 (0.07)	0.115 (0.07)	0.115 (0.07)

*Exact frequency must be specified.
**At second harmonic.

PD1600 RESPONSE CURVE



AF SERIES RESPONSE CURVE



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Load Terminations

25-1000 MHz

AL001	**1 Watt**
AL005	**5 Watt**
AL015	**15 Watt**
AL030	**30 Watt**
BL060	**60 Watt**
CL150	**150 Watt**
HL300D	**300 Watt**

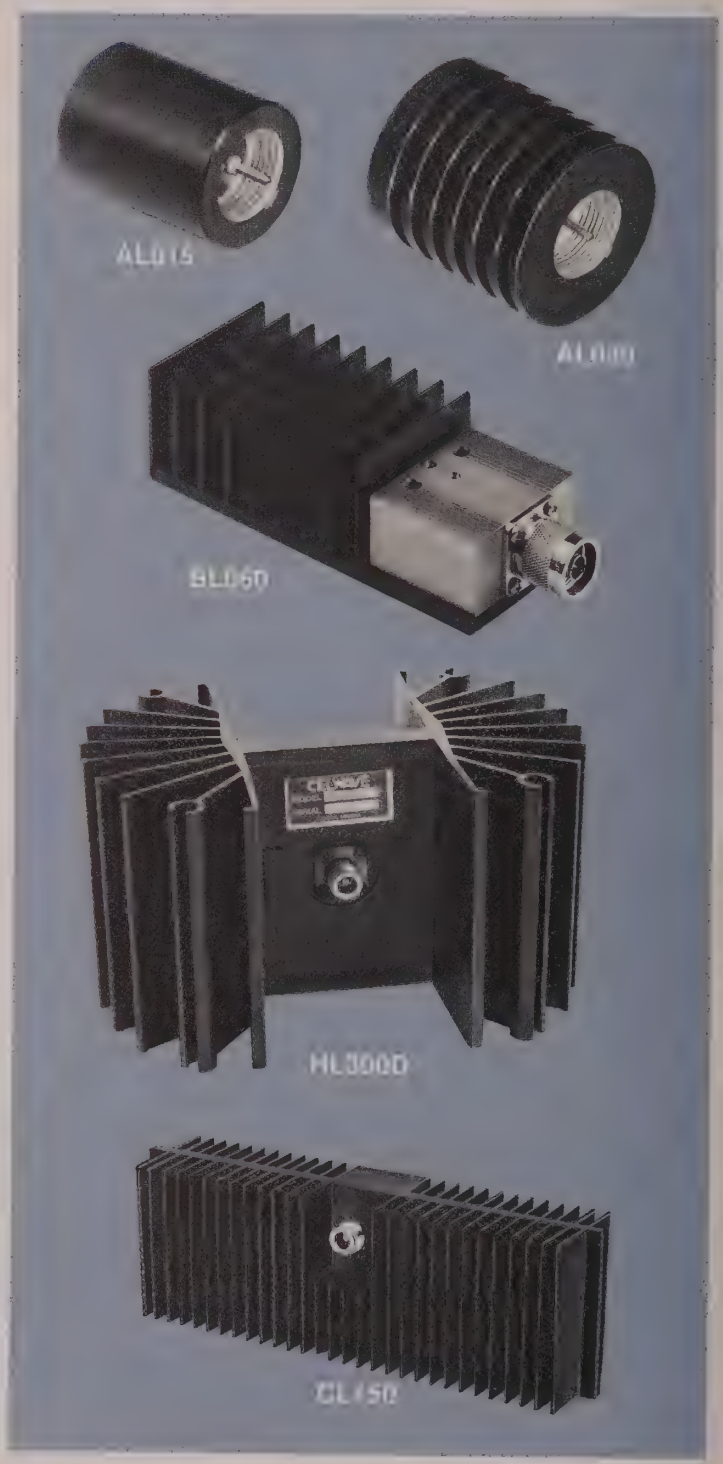
These load terminations absorb reflected power when used with an isolator or circulator. When used to terminate the port of a hybrid coupler, they provide the matched load to dissipate RF energy. They can also be used in place of an antenna during adjustment and testing of a transmitter.

This series of terminations is rated for the continuous dissipation of power from 1 to 300 Watts. A low VSWR over the entire 25-1000 MHz range assures minimum reflected power.

The 5, 15, 30 and 60 Watt units mount directly to a mating connector. Larger wattage units must be mounted independently and jumper connected. The improved BL060 Series offers options such as built-in RF sampler to allow periodic combining system examination without turning off channels other than the one being checked or adjusted. The BL060 Series is available with thermal switches (normally closed) with an actuation temperature of 160°F (71°C). The switch contacts are rated at 5A (30 VAC), 2.5A (125 VAC) and have solder tabs for interfacing with a control circuitry.

Ordering Information - BL060 Series

Item Number	Description
BL060-D	N-male connector
BL060-DS	With thermal switch (normally closed); N-male
BL060-DF	N-female connector



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Load Terminations

ELECTRICAL SPECIFICATIONS	AL001	AL005	AL015	AL030	BL060	CL150	HL300D
Power Rating - Watts	1	5	15	30	60	150	300
VSWR, Max. (25-1000 MHz)	1.3:1	1.1:1	1.1:1	1.1:1	1.1:1	1.1:1	1.1:1

MECHANICAL SPECIFICATIONS	AL001	AL005	AL015	AL030	BL060	CL150	HL300D
Height - in. (mm)	1 (25)	1-1/2 (38)	1-1/4 (32)	1-13/32 (35)	1-9/16 (39)	3-1/4 (83)	5 (127)
Length - in. (mm)	5/8 (16)	3/16 (5)	1 (25)	1-5/16 (33)	6 (152)	9-7/8 (251)	9-1/4 (235)
Width (Diameter) - in. (mm)	—	—	—	—	1-3/16 (30)	2-3/8 (60)	6-3/5 (171)
Weight - lbs. (kg)	0.03 (0.01)	0.1 (0.05)	0.1 (0.05)	0.13 (0.06)	0.87 (0.39)	2.63 (1.19)	4.75 (2.15)
Connector	BNC male	N-male	N-male	N-male	N-male (Std.)	N-female	N-female

Isolators and Circulators

66-88 MHz

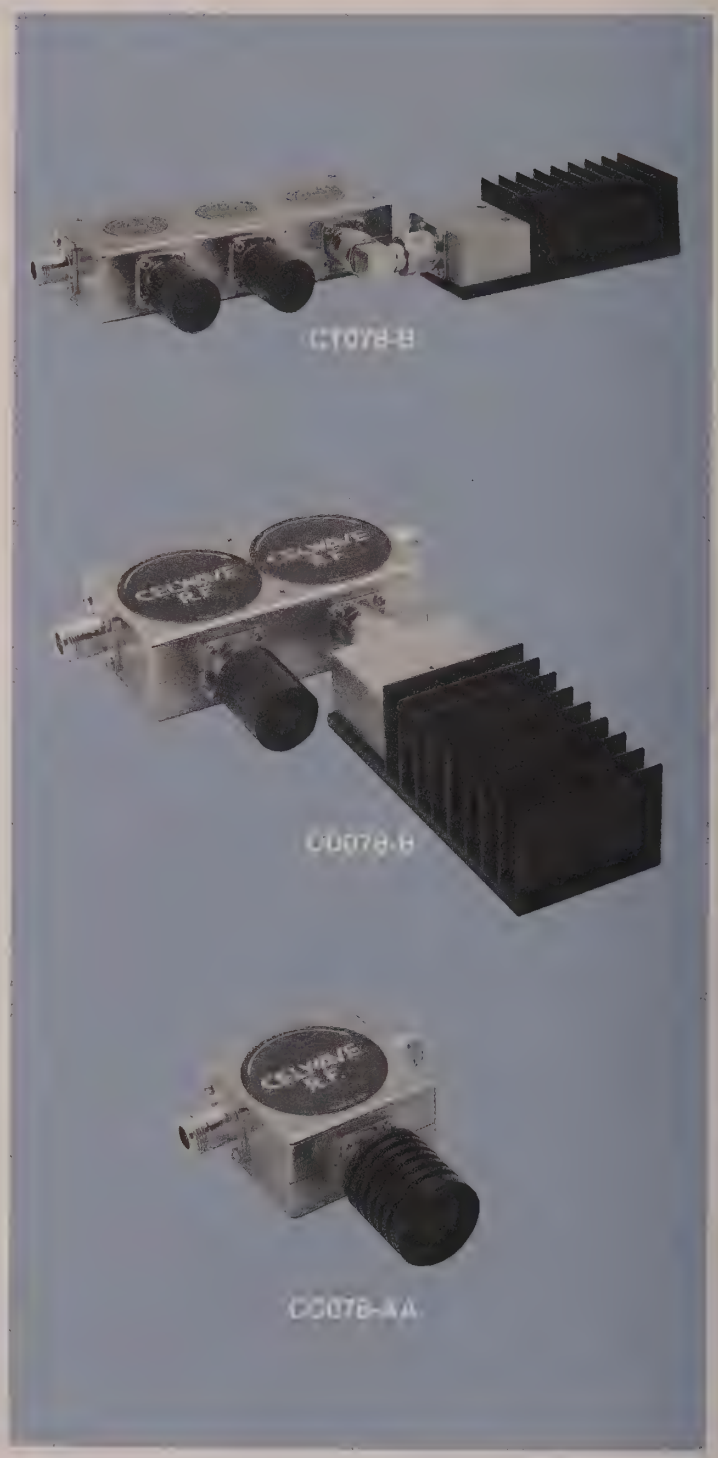
CC078 Series*	**Single Stage**
CD078 Series*	**Dual Stage**
CT078 Series*	**Triple Stage**
High Power	
HC070 Series*	**Single Stage**

***Exact frequencies must be specified.**

These rugged, compact units are for the prevention of transmitter intermodulation. Single, dual and triple stage isolators are available depending upon the amount of isolation required. Their formed steel enclosures offer excellent mechanical, RF and magnetic stability. As isolators, they may be ordered with various field-replaceable load terminations for the isolated port via the suffix designation listed in "Ordering Information". Four 4-40 x 5/16" deep threaded holes allow mounting of these units to any flat non-magnetic surface. As normally supplied, the circulation direction is from left to right.

Note: An isolator on the output of a transmitter should always have a harmonic filter between it and the antenna to prevent radiation of undesirable harmonics. Panel mounted isolators with harmonic filters are listed in this catalog on page 263.

- **High isolation** — Minimizes generation of intermod products.
- **Low loss** — Maximizes system performance.
- **Formed steel** — Reliability under all operating conditions.
- **Temperature stable** — Assures minimum specified rejection across temperature range.



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Isolators and Circulators

ELECTRICAL SPECIFICATIONS	CC078 Series	CD078 Series	CT078 Series	HC070 Series
Frequency Range - MHz	66-88*	66-88*	66-88*	66-88*
Bandwidth - MHz	1	1	1	2.5% (min.) at fo
Isolation, Min. - dB	25	50	75	25
Insertion Loss, Min. - dB	1.0	1.8	2.7	0.5
Power Input, Max. - Watts	100	100	100	200
Temperature Range - °F (°C)	-22° to +140° (-30° to +60°)	-22° to +140° (-30° to +60°)	-22° to +140° (-30° to +60°)	-22° to +140° (-30° to +60°)
VSWR - Max.	1.25:1	1.25:1	1.25:1	1.25:1

*Frequency must be specified.

MECHANICAL SPECIFICATIONS	CC078 Series	CD078 Series	CT078 Series	HC070 Series
Dimensions - in. (mm) H x L x W Less Connectors and Loads	1-3/8 x 2-1/2 x 2-1/2 (35 x 64 x 64)	1-3/8 x 4-1/2 x 2-1/2 (35 x 114 x 64)	1-3/8 x 6-1/2 x 2-1/2 (35 x 165 x 64)	1-1/2 x 4-1/4 x 4 (38 x 108 x 102)
Weight - lbs. (kg)	See Ordering Information Below			
Connectors	N-female	N-female	N-female	N-female
Connector Dimensions - in. (mm) H x L x W	1.11 x 1.0 x 1.11 (28.2 x 25.4 x 28.2)			

ORDERING INFORMATION

This series is available as circulators without an output stage isolated port load termination and with a 15 Watt termination on the isolated port of input stage one (dual series), and one and two for the triple series, or as isolators with field-replaceable load terminations for several power ratings. To order, select the proper suffix from the list below and specify the operating frequency. Please note that the specifications cannot be guaranteed when a termination not manufactured by CELWAVE is used.

OUTPUT LOAD TERMINATION SUPPLIED	SUFFIX	TOTAL WEIGHT - LBS. (KG) CC078	CD078	CT078	HC070
None (Circulator)	-O	0.84 (0.38)	1.40 (0.63)	2.30(1.05)	2.0 (.91)
15 Watts - AL015	-A	0.94 (0.43)	1.50 (0.68)	2.40 (1.09)	2.1 (.95)
30 Watts - AL030	-AA	0.97 (0.44)	1.53 (0.70)	2.43 (1.10)	2.13 (.97)
60 Watts - BLO60	-B	1.44 (0.65)	2.10 (.95)	3.00 (1.36)	2.6 (1.18)
60 Watts (Sensed)[1] - BL060 - S	-S	1.45 (.068)	2.20 (1.00)	3.10 (1.41)	2.7 (1.22)
150 Watt[2] - CL150	-C	3.47 (1.57)	4.03 (1.83)	4.03 (1.83)	4.9 (2.22)
300 Watt[3] - HL300D	-H	5.59 (2.54)	6.15 (2.79)	7.05 (3.19)	7.1 (3.22)

[1]Supplied with normally closed (NC) thermal sensor, actuation temperature 160 °F (71 °C).
[2]Supplied mounted on 19 inch (483 mm) Rack Tray, 3-1/2 inches (89 mm) high, 8 inches (203 mm) deep.
[3]Supplied mounted on 19 inch (483 mm) Rack Tray, 5-1/4 inches (133 mm) high, 12 inches (305 mm) deep.

Isolators and Circulators

136-174 / 250-285 MHz

CC150 Series*	**Single Stage**
CC280 Series*	**Single Stage**
CD150 Series*	**Dual Stage**
CD280 Series*	**Dual Stage**
CT150 Series*	**Triple Stage**
HC150 Series*	**Single Stage High Power**
HD150 Series*	**Dual Stage High Power**

***Exact frequencies must be specified.**

These rugged, compact units are for the prevention of transmitter intermodulation. Single, dual and triple stage isolators are available depending upon the amount of isolation required. Their formed steel enclosures offer excellent mechanical, RF and magnetic stability. As isolators, they may be ordered with various field-replaceable load terminations for the isolated port via the suffix designation listed in "Ordering Information". Four 4-40 x 5/16" deep threaded holes allow mounting of these units to any flat non-magnetic surface. As normally supplied, the circulation direction is from left to right.

Note: An isolator on the output of a transmitter should always have a harmonic filter between it and the antenna to prevent radiation of undesirable harmonics. Panel mounted isolators with harmonic filters are listed in this catalog on page 265.

• **High isolation**	Minimizes generation of intermod products.
• **Low loss**	Maximizes system performance.
• **Formed steel**	Reliability under all operating conditions.
• **Temperature stable**	Assures minimum specified rejection across temperature range.

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Isolators and Circulators

ELECTRICAL SPECIFICATIONS	CC150	CC280	CD150	CD280	CT150	HC150	HD150
Frequency Range - MHz	136-174	250-285	136-174	250-285	136-174	136-174	136-174
Bandwidth - MHz	4	8	4	8	4	10	10
Isolation, Min. - dB	25	25	50	50	75	25	50
Insertion Loss, Max. - dB	0.6	0.4	1.0	0.8	1.5	0.5	0.9
Power Input, Max. - Watts	125	100	125	100	125	350	350
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)						
VSWR - Max.	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1
Input/Output Return Loss, Min. - dB	—	19	—	19	—	—	—

MECHANICAL SPECIFICATIONS	CC150 CC280	CD150 CD280	CT150	HC150	HD150
Dimensions - in. (mm) H x L x D Less Connectors and Loads	1-3/8 x 2-1/2 x 2-1/2 (35 x 64 x 64)	1-3/8 x 4-1/2 x 2-1/2 (35 x 114 x 64)	1-3/8 x 6-1/2 x 2-1/2 (35 x 165 x 64)	1-5/8 x 5-1/2 x 5-1/2 (41 x 140 x 140)	1-3/4 x 11-1/8 x 5-1/2 (44 x 283 x 140)
Weight - lbs. (kg)	See Ordering Information Below				
Connector	N-female	N-female	N-female	N-female	N-female
Connector Dimensions - in. (mm) H x L x W	1.11 x 1.0 x 1.11 (28.2 x 25.4 x 28.2)				

ORDERING INFORMATION

This Series is available as circulators without an output stage isolated port load termination and with a 15 Watt termination on the isolated port of input stage one (dual series), and one and two for the triple series, or as isolators with field-replaceable load terminations for several power ratings. To order, select the proper suffix from the list below and specify the operating frequency. Please note that the specifications cannot be guaranteed when a termination not manufactured by CELWAVE is used.

OUTPUT STAGE ISOLATED PORT TERMINATION SUPPLIED	SUFFIX	TOTAL WEIGHT - lbs. (kg) CC150 CC280	CD150 CD280	CT150	HC150	HD150
None (Circulator)	-O	0.84 (0.38)	1.40 (0.63)	2.30 (1.05)	6.8 (3.08)	13.5 (6.12)
15 Watt - AL015	-A	0.94 (0.43)	1.50 (0.68)	2.40 (1.09)	6.9 (3.13)	13.6 (6.17)
30 Watt - AL030	-AA	0.97 (0.44)	1.53 (0.70)	2.43 (1.10)	7.0 (3.14)	13.63 (6.18)
60 Watt - BL060	-B	1.44 (0.65)	2.10 (0.95)	3.00 (1.36)	7.4 (3.35)	14.1 (6.39)
60 Watt (Sensed)[1] - BL060-S	-S	1.45 (0.68)	2.20 (1.00)	3.10 (1.41)	7.5 (3.40)	14.2 (6.44)
150 Watt[2] - CL150	-C	3.47 (1.57)	4.0 (1.83)	4.03 (1.83)	11.7 (5.31)	16.1 (7.32)
300 Watt[3] - HL300D	-H	5.59 (2.54)	6.15 (2.79)	7.05 (3.19)	13.9 (6.30)	18.3 (8.28)

[1]Supplied with normally closed (NC) thermal sensor, actuation temperature 160°F (71°C).
[2]Supplied mounted on 19 in. (483 mm) Rack Tray, 3-1/2 in. (89 mm) high, 8 in. (203 mm) deep.
[3]Supplied mounted on 19 in. (483 mm) Rack Tray, 5-1/4 in. (133 mm) high, 12 in. (305 mm) deep.

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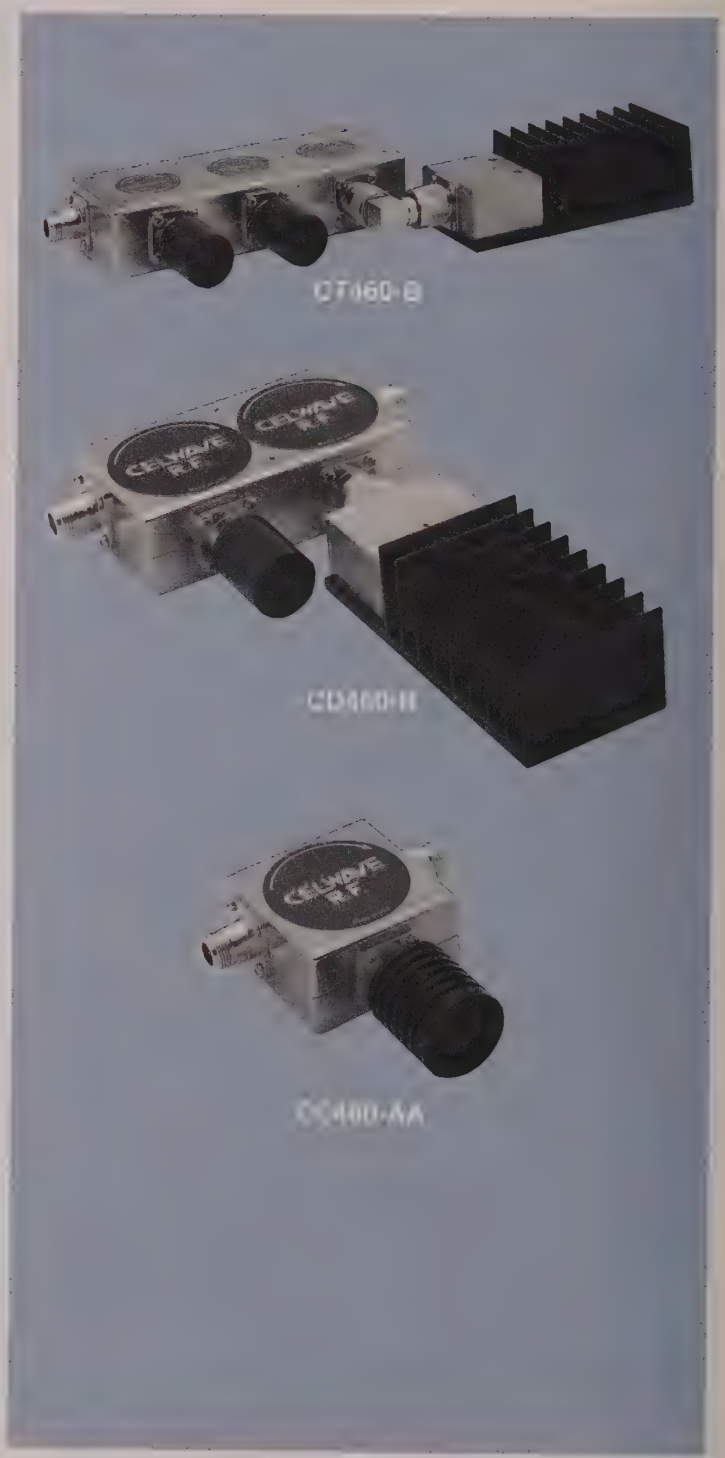
Isolators and Circulators

406-512 MHz

CC460*	**Single Stage**
CD460*	**Dual Stage**
CT460*	**Triple Stage**
HC460*	**Single Stage High Power**
HD460*	**Dual Stage High Power**

***Exact frequencies must be specified.**



These rugged, compact units are for the prevention of transmitter intermodulation. Single, dual and triple stage isolators are available depending upon the amount of isolation required. Their formed steel enclosures offer excellent mechanical, RF and magnetic stability. As isolators, they may be ordered with various field-replaceable load terminations for the isolated port via the suffix designation listed in "Ordering Information". Four 4-40 x 5/16" deep threaded holes allow mounting of these units to any flat non-magnetic surface. As normally supplied, the circulation direction is from left to right.

Note: An isolator on the output of a transmitter should always have a harmonic filter between it and the antenna to prevent radiation of undesirable harmonics. Panel mounted isolators with harmonic filters are listed in this catalog on page 267.

• **High isolation**	Minimizes generation of intermod products.
• **Low loss**	Maximizes system performance.
• **Formed steel**	Reliability under all operating conditions.
• **Temperature stable**	Assures minimum specified rejection across temperature range.

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Isolators and Circulators

ELECTRICAL SPECIFICATIONS	CC460 Series	CD460 Series	CT460 Series	HC460 Series	HD460 Series
Frequency Range - MHz	406-512	406-512	406-512	406-512	406-512
Bandwidth - MHz	12	12	12	28	28
Isolation, Min. - dB	25	50	75	25	50
Insertion Loss, Max. - dB	0.5	0.9	1.3	0.4	0.8
Power Input, Max. - Watts	125	125	125	300	300
Temperature Range - °F (°C)			$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		
VSWR - Max.	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	CC460 Series	CD460 Series	CT460 Series	HC460 Series	HD460 Series
Dimensions - in. (mm) H x L x D Less Connectors and Loads	1-3/8 x 2-1/2 x 2-1/2 (35 x 64 x 64)	1-3/8 x 4-1/2 x 2-1/2 (35 x 114 x 64)	1-3/8 x 6-1/2 x 2-1/2 (35 x 165 x 64)	1-1/2 x 3-1/2 x 3-1/2 (38 x 89 x 89)	1-1/2 x 7 x 3-1/2 (38 x 178 x 89)
Weight - lbs. (kg)	See Ordering Information Below				
Connector	N-female	N-female	N-female	N-female	N-female
Connector Dimensions - in. (mm) H x L x W	1.11 x 1.0 x 1.11 (28.2 x 25.4 x 28.2)				

ORDERING INFORMATION

This Series is available as circulators without an output stage isolated port load termination and with a 15 Watt termination on the isolated port of input stage one (dual series), and one and two for the triple series, or as isolators with field-replaceable load terminations for several power ratings. To order, select the proper suffix from the list below and specify the operating frequency. Please note that the specifications cannot be guaranteed when a termination not manufactured by CELWAVE is used.

OUTPUT STAGE ISOLATED PORT TERMINATION SUPPLIED	SUFFIX	TOTAL WEIGHT - lbs. (kg) CC460	CD460	CT460	HC460	HD460
None (Circulator)	-O	0.84 (0.38)	1.40 (0.63)	2.30 (1.05)	2.20 (0.99)	4.0 (1.8)
15 Watt - AL015	-A	0.94 (0.43)	1.50 (0.68)	2.40 (1.09)	2.3 (1.04)	4.1 (1.86)
30 Watt - AL030	-AA	0.97 (0.44)	1.53 (0.70)	2.43 (1.10)	2.33 (1.05)	4.13 (1.87)
60 Watt - BL060	-B	1.44 (0.65)	2.10 (0.95)	3.00 (1.36)	2.80 (1.27)	4.60 (2.09)
60 Watt (Sensed)[1] - BL060-S	-S	1.45 (0.68)	2.20 (1.00)	3.10 (1.41)	2.90 (1.32)	4.70 (2.13)
150 Watt[2] - CL150	-C	3.47 (1.57)	4.03 (1.83)	4.03 (1.83)	4.83 (2.19)	6.63 (3.01)
300 Watt[3] - HL300D	-H	5.59 (2.54)	6.15 (2.79)	7.05 (3.19)	6.95 (3.15)	8.75 (3.97)

[1]Supplied with normally closed (NC) thermal sensor, actuation temperature 160°F (71°C).
[2]Supplied mounted on 19 in. (483 mm) Rack Tray, 3-1/2 in. (89 mm) high, 8 in. (203 mm) deep.
[3]Supplied mounted on 19 in. (483 mm) Rack Tray, 5-1/4 in. (133 mm) high, 12 in. (305 mm) deep.

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Isolators and Circulators

806-1000 MHz

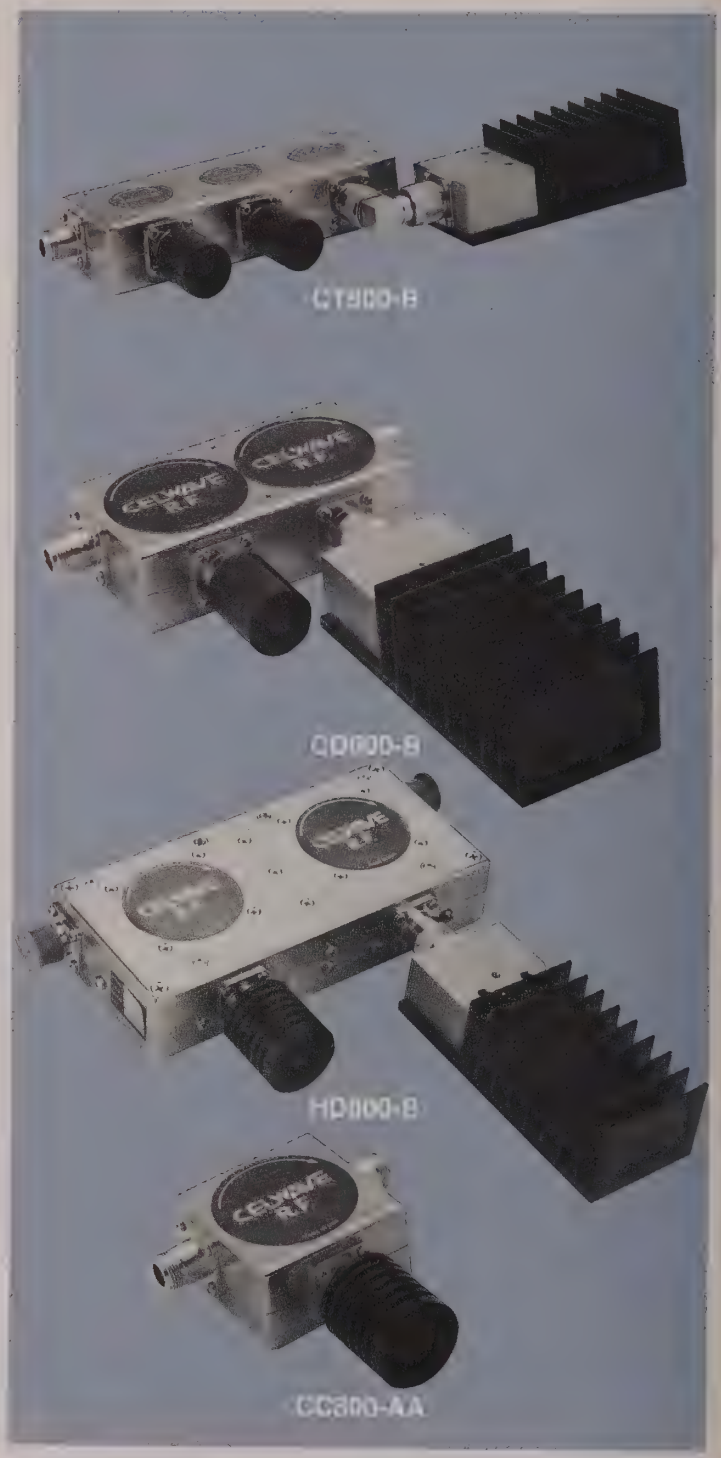
CC800*	**Single Stage**
CD800*	**Dual Stage**
CT800*	**Triple Stage**
HC800*	**Single Stage High Power**
HD800*	**Dual Stage High Power**

***Exact frequencies must be specified.**

These rugged, compact units are for the prevention of transmitter intermodulation. Single, dual and triple stage isolators are available depending upon the amount of isolation required. Their formed steel enclosures offer excellent mechanical, RF and magnetic stability. As isolators, they may be ordered with various field-replaceable load terminations for the isolated port via the suffix designation listed in "Ordering Information". Four 4-40 x 5/16" deep threaded holes allow mounting of these units to any flat non-magnetic surface. As normally supplied, the circulation direction is from left to right.

Note: An isolator on the output of a transmitter should always have a harmonic filter between it and the antenna to prevent radiation of undesirable harmonics. Panel mounted isolators with harmonic filters are listed in this catalog on page 269.

• **High isolation**	Minimizes generation of intermod products.
• **Low loss**	Maximizes system performance.
• **Formed steel**	Reliability under all operating conditions.
• **Temperature stable**	Assures minimum specified rejection across temperature range.



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Isolators and Circulators

ELECTRICAL SPECIFICATIONS	CC800 Series	CD800 Series	CT800 Series	HC800 Series	HD800 Series
Frequency Range - MHz	806-1000	806-1000	806-1000	806-1000	806-1000
Bandwidth - MHz	50	50	50	55	55
Isolation, Min. - dB	25	50	75	25	50
Insertion Loss, Max. - dB	0.4	0.7	1.0	0.25	0.50
Power Input, Max. - Watts	150	150	150	300	300
Temperature Range - °F (°C)			$^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)		
VSWR - Max.	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	CC800 Series	CD800 Series	CT800 Series	HC800 Series	HD800 Series
Dimensions - in. (mm) H x L x D Less Connectors and Loads	1-3/8 x 2-1/2 x 2-1/2 (35 x 64 x 64)	1-3/8 x 4-1/2 x 2-1/2 (35 x 114 x 64)	1-3/8 x 6-1/2 x 2-1/2 (35 x 165 x 64)	1-1/2 x 3-1/2 x 3-1/2 (38 x 89 x 89)	1-1/2 x 7 x 3-1/2 (38 x 178 x 89)
Weight - lbs. (kg)	0.84 (0.38)	1.40 (0.63)	2.30 (1.04)	2.2 (1.0)	4.0 (1.8)
Connector	N-female	N-female	N-female	N-female	N-female
Connector Dimensions - in. (mm) H x L x W			1.11 x 1.0 x 1.11 (28.2 x 25.4 x 28.2)		

ORDERING INFORMATION

This Series is available as circulators without an output stage isolated port load termination and with a 15 Watt termination on the isolated port of input stage one (dual series), and one and two for the triple series, or as isolators with field-replaceable load terminations for several power ratings. To order, select the proper suffix from the list below and specify the operating frequency. Please note that the specifications cannot be guaranteed when a termination not manufactured by CELWAVE is used.

OUTPUT STAGE ISOLATED PORT TERMINATION SUPPLIED	SUFFIX	TOTAL WEIGHT - lbs. (kg) CC800	CD800	CT800	HC800	HD800
None (Circulator)	-O	0.84 (0.38)	1.40 (0.63)	2.30 (1.05)	2.20 (1.0)	4.0 (1.8)
15 Watt - AL015	-A	0.94 (0.43)	1.50 (0.68)	2.40 (1.09)	2.3 (1.04)	4.1 (1.85)
30 Watt - AL030	-AA	0.97 (0.44)	1.53 (0.70)	2.43 (1.10)	2.33 (1.06)	4.13 (1.87)
60 Watt - BL060	-B	1.44 (0.65)	2.10 (0.95)	3.00 (1.36)	2.80 (1.27)	4.60 (2.08)
60 Watt (Sensed)[1] - BL060-S	-S	1.45 (0.68)	2.20 (1.00)	3.10 (1.41)	2.90 (1.31)	4.70 (2.13)
150 Watt[2] - CL150	-C	3.47 (1.57)	4.03 (1.83)	4.03 (1.83)	4.83 (2.19)	6.63 (3.00)
300 Watt[3] - HL300D	-H	5.59 (2.54)	6.15 (2.79)	7.05 (3.19)	6.95 (3.15)	8.75 (3.96)

[1]Supplied with normally closed (NC) thermal sensor, actuation temperature 160°F (71°C).
[2]Supplied mounted on 19 in. (483 mm) Rack Tray, 3-1/2 in. (89 mm) high, 8 in. (203 mm) deep.
[3]Supplied mounted on 19 in. (483 mm) Rack Tray, 5-1/4 in. (133 mm) high, 12 in. (305 mm) deep.

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Isolator Panels

66-76 / 76-88 MHz

PCC078* **Single Stage**
PCD078* **Dual Stage**
PCT078* **Triple Stage**
PHC070* **Single Stage, High Power**

***Exact frequencies must be specified.**

The PCC, PCD, PCT Series Isolator Panels provide a factory-tuned package designed to prevent on-site transmitter intermodulation. They consist of a single, dual or triple (respectively) Isolator and an AF Series Tunable Second Harmonic Filter mounted on a compact standard rack tray. These units are precisely tuned to the specified frequency and feature 25, 50 or 75 dB minimum isolation over their rated bandwidths and 40 dB minimum rejection of the second harmonic of the operating frequency. This series may be ordered with a 30, 60, 150 or 300 Watt load termination on the isolated port depending on transmitter power and degree of output VSWR protection required.

The input stage isolated port of the PCD dual isolator is supplied with a 15 Watt termination. The PCT triple isolator comes with 15 Watt terminations on isolated port stages one and two. The PHC high power isolator panels are capable of 200 Watts of input power. They are supplied mounted on a 19 inch rack panel with harmonic filter and jumper cable.

• **High isolation**	Minimizes on site transmitter intermodulation.
• **Harmonic filter**	Provides rejection of second harmonic products.
• **Temperature stable**	Assures minimum specified rejection across temperature and power range.
• **Factory pretuned**	Eliminates need for tuning in the field.

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Isolator Panels

ELECTRICAL SPECIFICATIONS	PCC078 Series	PCD078 Series	PCT078 Series	PHC070 Series
Frequency Range - MHz	66-76*, 76-88*	66-76*, 76-88*	66-76*, 76-88*	66-76*, 76-88*
Bandwidth - MHz	1	1	1	2.5% (min.) at fo
Isolation, Min. - dB	25	50	75	25
Insertion Loss, Max. - dB	1.05	1.85	2.90	0.5
Power Input, Max. - Watts	100	100	100	200
Temperature Range - °F (°C)		$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)
VSWR - Max.	1.25:1	1.25:1	1.25:1	1.25:1

*Band split 66-76, 76-88 MHz frequency must be specified.

MECHANICAL SPECIFICATIONS	PCC078 Series	PCD078 Series	PCT078 Series	PHC070 Series
Dimensions - in. (mm)	Supplied on 19 (483) Rack Tray, 3-1/2 (89) High, 8 (203) Deep			See Below
Weight - lbs. (kg)	See Ordering Information Below			
Connectors	N-female	N-female	N-female	N-female
PH070 Series Dimensions - in. (mm)	19 (483) Rack Tray, 5-1/4 (133) High, 12 (305) Deep			

ORDERING INFORMATION

The PCD input stage isolated port is supplied with a 15 Watt termination. The PCT series comes with 15 Watt termination on isolated port stages one and two. The output stage isolated port termination may be chosen from the table below. To order, select the proper suffix and specify the operating frequency.

OUTPUT LOAD TERMINATION SUPPLIED	SUFFIX	TOTAL WEIGHT - lbs. (kg) PCC078	PCD078	PCT078	PHC070
None (Circulator)	-O	4.00 (1.81)	4.50 (2.04)	5.30 (2.40)	10.10 (4.58)
30 Watt - AL030	-AA	4.13 (1.87)	4.63 (2.10)	5.43 (2.46)	10.23 (4.64)
60 Watt - BL060	-B	4.60 (2.09)	5.10 (2.31)	5.90 (2.68)	10.70 (4.85)
60 Watt - (Sensed)* - BL060-S	-S	4.70 (2.13)	5.20 (2.36)	6.00 (2.72)	10.80 (4.89)
150 Watt - CL150	-C	6.63 (3.01)	7.13 (3.23)	7.93 (3.59)	12.73 (5.77)
300 Watt - HL300D	-H	8.75 (3.97)	9.25 (4.19)	10.05 (4.56)	14.85 (6.74)

*Supplied with normally closed (NC) thermal sensor, actuation temperature 160°F (71°C).

Isolator Panels

136-174 MHz

PCC150*	**Single Stage**
PCD150*	**Dual Stage**
PCT150*	**Triple Stage**
PHC150*	**Single Stage High Power**
PHD150*	**Dual Stage High Power**

***Exact frequencies must be specified.**

The PCC, PCD, PCT Series Isolator Panels provide a factory-tuned package designed to suppress on-site transmitter intermodulation. They consist of a single, dual or triple Isolator and an AF Series Tunable Second Harmonic Filter mounted on a compact standard rack tray. These units are precisely tuned to the specified frequency and feature 25, 50 or 75 dB minimum isolation over their rated bandwidth and 40 dB minimum rejection of the second harmonic of the operating frequency. This series may be ordered with a 30, 60, 150 or 300 Watt load termination on the isolated port depending on transmitter power and degree of output VSWR protection required.

The input stage isolated port of the PCD dual isolator is supplied with a 15 Watt termination. The PCT triple isolator comes with 15 Watt terminations on isolated port stages one and two. The PHC and PHD high power isolator panels are capable of 350 Watts of input power. These are supplied mounted on a 19 inch rack panel with a harmonic filter and jumper cable. The PHD dual stage panel has a 30 Watt termination on the input stage isolated port.

• **High isolation**	Minimizes on site transmitter intermodulation.
• **Harmonic filter**	Provides rejection of second harmonic products.
• **Temperature stable**	Assures minimum specified rejection across temperature and power range.
• **Factory pretuned**	Eliminates need for tuning in the field.

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Isolator Panels

ELECTRICAL SPECIFICATIONS	PCC150 Series	PCD150 Series	PCT150 Series	PHC150 Series	PHD150 Series
Frequency Range - MHz	136-174	136-174	136-174	136-174	136-174
Bandwidth - MHz	4	4	4	10	10
Isolation, Min. - dB	25	50	75	25	50
Insertion Loss, Max. - dB	0.65	1.0	1.6	0.45	0.95
Power Input, Max. - Watts	125	125	125	350	350
Temperature Range - °F (°C)			$^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)		
VSWR, Max.	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	PCC150 Series	PCD150 Series	PCT150 Series	PHC150 Series	PHD150 Series
Dimensions - in. (mm)	Supplied on 19 (483) Rack Tray, 3-1/2 (89) High, 8 (203) Deep			Supplied on 19 (483) Rack Tray, 5-1/4 (133) High, 12 (305) Deep	
Weight - lbs. (kg)	See Ordering Information Below				
Connectors	N-female	N-female	N-female	N-female	N-female

ORDERING INFORMATION

The PCD input stage isolated port is supplied with a 15 Watt termination, the PHD with a 30 Watt termination. The PCT series comes with 15 Watt terminations on isolated port stages one and two. The output stage isolated port termination may be chosen from the table below. To order, select the proper suffix and specify the operating frequency.

OUTPUT LOAD TERMINATION SUPPLIED	SUFFIX	TOTAL WEIGHT - lbs. (kg) PC150	PCD150	PCT150	PHC150	PHD150
None (Circulator)	-O	4.00 (1.81)	4.50 (2.04)	5.30 (2.40)	10.10 (4.58)	17.00 (7.71)
30 Watt - AL030	-AA	4.13 (1.87)	4.63 (2.10)	5.43 (2.46)	10.23 (4.64)	17.13 (7.77)
60 Watt - BL060	-B	4.60 (2.09)	5.10 (2.31)	5.90 (2.68)	10.70 (4.85)	17.60 (7.98)
60 Watt (Sensed)* - BL060-S	-S	4.70 (2.13)	5.20 (2.36)	6.00 (2.72)	10.80 (4.89)	17.70 (8.03)
150 Watt - CL150	-C	6.63 (3.01)	7.13 (3.23)	7.93 (3.59)	12.73 (5.77)	19.63 (8.90)
300 Watt - HL300D	-H	8.75 (3.97)	9.25 (4.19)	10.05 (4.56)	14.85 (6.74)	21.75 (9.87)

*Supplied with normally closed (NC) thermal sensor, actuation temperature 160°F (71°C).

Isolator Panels

406-512 MHz

PCC460*	**Single Stage**
PCD460*	**Dual Stage**
PCT460*	**Triple Stage**
PHC460*	**Single Stage High Power**
PHD460*	**Dual Stage High Power**

***Exact frequencies must be specified.**

The PCC, PCD, PCT Series Isolator Panels provide a factory-tuned package designed to suppress on-site transmitter intermodulation. They consist of a single, dual or triple isolator and an AF Series Tunable Second Harmonic Filter mounted on a compact, standard rack tray. These units are precisely tuned to the specified frequency and feature 25, 50 or 75 dB minimum isolation over their rated bandwidth and 40 dB minimum rejection of the second harmonic of the operating frequency. This series may be ordered with a 30, 60, 150 or 300 Watt load termination on the isolated port, depending on transmitter power and degree of output VSWR protection required.

The input stage isolated port of the PCD dual isolator is supplied with a 15 Watt termination. The PCT triple isolator comes with 15 Watt terminations on isolated port stages one and two.

The PHC and PHD high power isolator panels are capable of 300 Watts of input power. These are supplied mounted on a 19 inch rack panel with a harmonic filter and jumper cable. The PHD dual stage panel has a 30 Watt termination on the input stage isolated port.

• **High isolation**	Minimizes on site transmitter intermodulation.
• **Harmonic filter**	Provides rejection of second harmonic products.
• **Temperature stable**	Assures minimum specified rejection across temperature and power range.
• **Factory pretuned**	Eliminates need for tuning in the field.

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Isolator Panels

ELECTRICAL SPECIFICATIONS	PCC460	PCD460	PCT460	PHC460	PHD460
Frequency Range - MHz	406-512	406-512	406-512	406-512	406-512
Bandwidth - MHz	12	12	12	28	28
Isolation, Min. - dB	25	50	75	25	50
Insertion Loss, Max. - dB	0.55	0.95	1.5	0.45	0.95
Power Input, Max. - Watts	125	125	125	300	300
Temperature Range - °F (°C)			$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		
VSWR, Max.	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	PCC460	PCD460	PCT460	PHC460	PHD460
Dimensions - in. (mm)	Supplied on 19 (483) Rack Tray, 3-1/2 (89) High, 8 (203) Deep			Supplied on 19 (483) Rack Tray, 5-1/4 (133) High, 12 (305) Deep	
Weight - lbs. (kg)	See Ordering Information Below				
Connectors	N-female	N-female	N-female	N-female	N-female

ORDERING INFORMATION

The PCD input stage isolated port is supplied with a 15 Watt termination, the PHD with a 30 Watt termination. The PCT series comes with 15 Watt terminations on isolated port stages one and two. The output stage isolated port termination may be chosen from the table below. To order, select the proper suffix and specify the operating frequency.

OUTPUT LOAD TERMINATION SUPPLIED	SUFFIX	TOTAL WEIGHT - lbs. (kg) PCC460	PCD460	PCT460	PHC460	PHD460
None (Circulator)	-O	4.00 (1.81)	4.50 (2.04)	5.30 (2.40)	5.90 (2.68)	8.60 (3.90)
30 Watt - AL030	-AA	4.13 (1.87)	4.63 (2.10)	5.43 (2.46)	6.03 (2.74)	8.73 (3.96)
60 Watt - BL060	-B	4.60 (2.09)	5.10 (2.31)	5.90 (2.68)	6.50 (2.95)	9.20 (4.17)
60 Watt (Sensed)* - BL060-S	-S	4.70 (2.13)	5.20 (2.36)	6.00 (2.72)	6.70 (3.04)	9.30 (4.22)
150 Watt - CL150	-C	6.63 (3.01)	7.13 (3.23)	7.93 (3.59)	8.53 (3.87)	11.23 (5.09)
300 Watt - HL300D	-H	8.75 (3.97)	9.25 (4.19)	10.05 (4.56)	10.65 (4.83)	13.35 (6.06)

*Supplied with normally closed (NC) thermal sensor, actuation temperature 160°F (71°C).

Isolator Panels

806-1000 MHz

PCC800*	**Single**
PCD800*	**Dual Stage**
PCT800*	**Triple Stage**
PHC800*	**Single Stage High Power**
PHD800*	**Dual Stage High Power**

***Exact frequencies must be specified.**

The PCC, PCD, PCT Series Isolator Panels provide a factory-tuned package designed to suppress on-site transmitter intermodulation. They consist of a single, dual or triple isolator and an AF Series Tunable Second Harmonic Filter mounted on a compact, standard rack tray. These units are precisely tuned to the specified frequency and feature 25, 50 or 75 dB minimum isolation over their rated bandwidth and 40 dB minimum rejection of the second harmonic of the operating frequency. This series may be ordered with a 30, 60, 150 or 300 Watt load termination on the isolated port, depending on transmitter power and degree of output VSWR protection required.

The input stage isolated port of the PCD dual isolator is supplied with a 15 Watt termination. The PCT triple isolator comes with 15 Watt terminations on isolated port stages one and two.

The PHC and PHD high power isolator panels are capable of 300 Watts of input power. These are supplied mounted on a 19 inch rack panel with a harmonic filter and jumper cable. The PHD dual stage panel has a 30 Watt termination on the input stage isolated port.

• **High isolation**	Minimizes on site transmitter intermodulation.
• **Harmonic filter**	Provides rejection of second harmonic products.
• **Temperature stable**	Assures minimum specified rejection across temperature and power range.
• **Factory pretuned**	Eliminates need for tuning in the field.

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Isolator Panels

ELECTRICAL SPECIFICATIONS	PCC800	PCD800	PCT800	PHC800	PHD800
Frequency Range - MHz	806-1000	806-1000	806-1000	806-1000	806-1000
Bandwidth - MHz	50	50	50	55	55
Isolation, Min. - dB	25	50	75	25	50
Insertion Loss, Max. - dB	0.45	0.75	1.20	0.25	0.50
Power Input, Max. - Watts	150	150	150	300	300
Temperature Range - °F (°C)			$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		
VSWR, Max.	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	PCC800	PCD800	PCT800	PHC800	PHD800
Dimensions - in. (mm)	Supplied on 19 (483) Rack Tray, 3-1/2 (89) High, 8 (203) Deep			Supplied on 19 (483) Rack Tray, 5-1/4 (133) High, 12 (305) Deep	
Weight - lbs. (kg)	See Ordering Information Below				
Connectors	N-female	N-female	N-female	N-female	N-female

ORDERING INFORMATION

The PCD input stage isolated port is supplied with a 15 Watt termination, the PHD with a 30 Watt termination. The PCT series comes with 15 Watt terminations on isolated port stages one and two. The output stage isolated port termination may be chosen from the table below. To order, select the proper suffix and specify the operating frequency.

OUTPUT LOAD TERMINATION SUPPLIED	SUFFIX	TOTAL WEIGHT - lbs. (kg) PCC800	PCD800	PCT800	PHC800	PHD800
None (Circulator)	-O	4.00 (1.81)	4.50 (2.04)	5.30 (2.40)	5.70 (2.59)	8.40 (3.81)
30 Watt - AL030	-AA	4.13 (1.87)	4.63 (2.10)	5.43 (2.46)	5.83 (2.64)	8.53 (3.87)
60 Watt - BL060	-B	4.60 (2.09)	5.10 (2.31)	5.90 (2.68)	6.30 (2.86)	9.00 (4.08)
60 Watt (Sensed)* - BL060-S	-S	4.70 (2.13)	5.20 (2.36)	6.00 (2.72)	6.40 (2.90)	9.10 (4.13)
150 Watt - CL150	-C	6.63 (3.01)	7.13 (3.23)	7.93 (3.59)	8.30 (3.78)	11.00 (5.00)
300 Watt - HL300D	-H	8.75 (3.97)	9.25 (4.19)	10.05 (4.56)	13.20 (5.99)	15.90 (7.21)

*Supplied with normally closed (NC) thermal sensor, actuation temperature 160°F (71°C).

Hybrid-Ferrite Transmitter Combiners

68-88 / 136-174 / 279-281 MHz

	68-88 MHz*
TB, TC Series	**High Isolation**
	136-174 MHz*
TB, TC Series	**High Isolation**
TH Series	**High Power**
	279-281 MHz*
TC Series	**High Isolation**

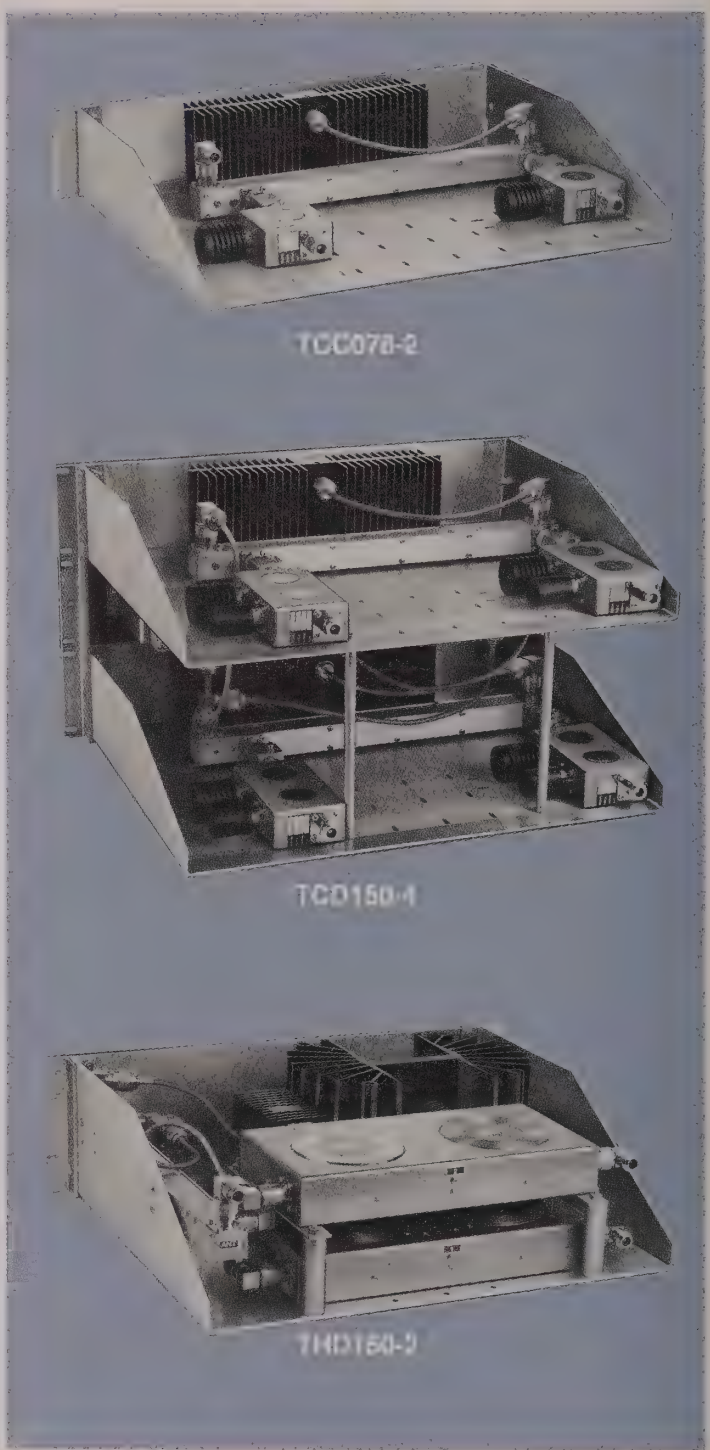
***Exact frequencies must be specified.**

Celwave hybrid-ferrite transmitter combiners are designed to couple multiple close spaced transmitters into one antenna. They are expandable, highly compact and accommodate close channel spacing with very high isolation.

The TBC and TCC are capable of coupling two or four transmitters of up to 125 Watts power rating and are equipped with 60 and 150 Watt loads respectivitely. Both use CC Series isolators to provide 50 dB minimum isolation. The TBD and TCD Series use CD Series dual isolators to provide 80 dB minimum isolation when the output hybrid is properly tuned to the antenna. A pair of two channel models may be field expanded to four channels by means of a PBH or PCH hybrid coupler panel and CAB-1 cable assembly.

The THC and THD high power units are available in either two or four channel configuration for 350 Watt transmitters. They provide 50 dB and 80 dB minimum isolation respectively.

• **Allows combining of multiple close spaced transmitters**	Maximizes use of tower space, reduces costs.
• **No minimum channel separation**	Can be used to combine two transmitters on same frequency.
• **High Isolation**	Minimizes the possibility of intermodulation.
• **Modular**	Simplifies on-site expansion.



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Hybrid-Ferrite Transmitter Combiners

2 Channel (66-88 MHz)

	Single Stage		Dual Stage	
ELECTRICAL SPECIFICATIONS	**TBC078-2**	**TCC078-2**	**TBD078-2**	**TCD078-2**
Frequency Range - MHz	66-88	66-88	66-88	66-88
Isolation, Min. Tx-Tx - dB	50	50	80	80
Isolation, Min. Ant.-Tx - dB	28	28	53	53
Insertion Loss, Max. per Channel - dB	4.2	4.2	4.9	4.9
Continuous Power Input, Max. per Channel - Watts	60	100	60	100
Reflected Power, Max. Allowable from Ant. - Watts	60	150	60	150
Channel Separation, for Specifications Given - KHz	25	25	25	25
Temperature Range - °F (°C)		$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	**TBC078-2**	**TCC078-2**	**TBD078-2**	**TCD078-2**
Dimensions - in. (mm) W x H x D on 19 in. (483 mm) Rack Tray	19 x 3-1/2 x 14 (483 x 89 x 356)		19 x 3-1/2 x 14 (483 x 89 x356)	
Weight - lbs. (kg)	8.25 (3.75)	10.38 (4.71)	9.25 (4.2)	11.38 (5.16)
Connectors	N-female	N-female	N-female	N-female

4 Channel (66-88 MHz)

	Single Stage		Dual Stage	
ELECTRICAL SPECIFICATIONS	**TBC078-4**	**TCC078-4**	**TBD078-4**	**TCD078-4**
Frequency Range - MHz	66-88	66-88	66-88	66-88
Isolation, Min. Tx-Tx - dB	50	50	80	80
Isolation, Min. Ant-Tx - dB	28	28	53	53
Insertion Loss, Max. per Channel - dB	7.5	7.5	8.2	8.2
Continuous Power Input, Max. per Channel - Watts	60	100	60	100
Reflected Power, Max. Allowable from Ant. - Watts	60	150	60	150
Channel Separation, for Specifications Given - KHz	25	25	25	25
Temperature Range - °F (°C)		$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	**TBC078-4**	**TCC078-4**	**TBD078-4**	**TCD078-4**
Dimensions - in. (mm) W x H x D on 19 in. (483mm) Rack Tray	19 x 10-1/2 x 14 (483 x 267 x 356)		19 x 10-1/2 x 14 (483 x 267 x 356)	
Weight - lbs. (kg)	20 (9.1)	27.3 (12.4)	22 (10)	29.3 (13.3)
Connectors	N-female	N-female	N-female	N-female

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Hybrid-Ferrite Transmitter Combiners

2 Channel (136-174 MHz)
(279-281 MHz)

ELECTRICAL SPECIFICATIONS	Single Stage TBC150-2	Single Stage TCC150-2 TCC280-2	Single Stage THC150-2	Dual Stage TBD150-2	Dual Stage TCD150-2 TCD280-2	Dual Stage THD150-2
Frequency Range - MHz	136-174	136-174 279-281	136-174	136-174	136-174 279-281	136-174
Isolation, Min. Tx-Tx - dB	50	50	50	80	80	80
Isolation, Min. Ant.-Tx - dB	28	28	28	53	53	53
Insertion Loss, Max. per Channel - dB	3.9	3.9	3.9	4.3	4.3	4.3
Continuous Power Input, Max. per Channel - Watts	60	125	350	60	125	350
Reflected Power, Max. Allowable from Ant. - Watts	60	150	300	60	150	300
Channel Separation, for Specifications Given - KHz	25	25	25	25	25	25
Temperature Range - °F (°C)			-22 to +140 (-30 to +60)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TBC150-2	TCC150-2 TCC280-2	THC150-2	TBD150-2	TCD150-2 TCD280-2	THD150-2
Dimensions - in. (mm) W x H x D on 19 in. (483 mm) Rack Tray	19 x 3-1/2 x 14 (483 x 89 x 356)		19 x 5-1/4 x 14 (483 x 133 x 356)	19 x 3-1/2 x 14 (483 x 89 x356)		19 x 5-1/4 x 14 (483 x 133 x 356)
Weight - lbs. (kg)	8.25 (3.75)	10.38 (4.71)	21.6 (9.8)	9.25 (4.2)	11.38 (5.16)	35.3 (15.9)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

4 Channel (136-174 MHz)
(279-281 MHz)

ELECTRICAL SPECIFICATIONS	Single Stage TBC150-4	Single Stage TCC150-4 TCC280-4	Single Stage THC150-4	Dual Stage TBD150-4	Dual Stage TCD150-4 TCD280-4	Dual Stage THD150-4
Frequency Range - MHz	136-174	136-174 279-281	136-174	136-174	136-174 279-281	136-174
Isolation, Min. Tx-Tx - dB	50	50	50	80	80	80
Isolation, Min. Ant-Tx - dB	28	28	28	53	53	53
Insertion Loss, Max. per Channel - dB	7.2	7.2	7.0	7.6	7.6	7.4
Continuous Power Input, Max. per Channel - Watts	60	125	350	60	125	350
Reflected Power, Max. Allowable from Ant. - Watts	60	150	300	60	150	300
Channel Separation, for Specifications Given - KHz	25	25	25	25	25	25
Temperature Range - °F (°C)			-22 to +140 (-30 to +60)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TBC150-4	TCC150-4 TCC280-4	THC150-4	TBD150-4	TCD150-4 TCD280-4	THD150-4
Dimensions - in. (mm) W x H x D on 19 in. (483 mm) Rack Tray	19 x 10-1/2 x 14 (483 x 267 x 356)		19 x 16 x 16 (483 x 406 x 406)	19 x 10-1/2 x 14 (483 x 267 x 356)		19 x 16 x 16 (483 x 406 x 406)
Weight - lbs. (kg)	20 (9.1)	27.3 (12.4)	57.3 (25.9)	22 (10)	29.3 (13.3)	84.3 (38.2)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

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Hybrid-Ferrite Transmitter Combiners

406-512 / 806-1000 MHz

	406-512 MHz*
TB, TC Series	**High Isolation**
TH Series	**High Power**
	806-1000 MHz*
TB, TC Series	**High Isolation**
TH Series	**High Power**

***Exact frequencies must be specified.**

These Celwave combiners are designed to maximize use of tower space and reduce costs by coupling multiple close spaced transmitters into one antenna. They are highly compact, modular and accommodate close channel spacing with very high isolation.

The TBC and TCC are capable of coupling two or four transmitters of up to 125 Watts power rating and are equipped with 60 and 150 Watt loads respectively. Both use our CC Series isolators to provide 50 dB minimum isolation. The TBD and TCD Series use our CD Series dual isolators to provide 80 dB minimum isolation when the output hybrid is properly tuned to the antenna. A pair of two channel units may be field expanded to four channels by means of a PBH or PCH hybrid coupler panel and a CAB-1 cable assembly.

The THC and THD high power units are available in either two or four channel configuration for 350 Watt transmitters. They provide 50 dB and 80 dB minimum isolation respectively.

• **Allows combining of multiple close spaced transmitters**	Maximizes use of tower space, reduces costs.
• **No minimum channel separation**	Can be used to combine two transmitters on same frequency.
• **High Isolation**	Minimizes the possibility of intermodulation.
• **Modular**	Simplifies on-site expansion.

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Hybrid-Ferrite Transmitter Combiners

2 Channel (406-512 MHz)

	Single Stage			Dual Stage		
ELECTRICAL SPECIFICATIONS	**TBC460-2**	**TCC460-2**	**THC460-2**	**TBD460-2**	**TCD460-2**	**THD460-2**
Frequency Range - MHz	406-512	406-512	406-512	406-512	406-512	406-512
Isolation, Min. Tx-Tx - dB	50	50	50	80	80	80
Isolation, Min. Ant.-Tx - dB	28	28	28	53	53	53
Insertion Loss, Max. per Channel - dB	3.9	3.9	3.9	4.2	4.2	4.3
Continuous Power Input, Max. per Channel - Watts	60	125	300	60	125	300
Reflected Power, Max. Allowable from Ant. - Watts	60	150	300	60	150	300
Channel Separation, for Specifications Given - KHz	25	25	25	25	25	25
Temperature Range - °F (°C)			$^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	**TBC460-2**	**TCC460-2**	**THC460-2**	**TBD460-2**	**TCD460-2**	**THD460-2**
Dimensions - in. (mm) W x H x D on 19 in. (483 mm) Rack Tray	19 x 3-1/2 x 14 (483 x 89 x 356)		19 x 5-1/4 x 14 (483 x 133 x 356)	19 x 3-1/2 x 14 (483 x 89 x356)		19 x 5-1/4 x 14 (483 x 133 x 356)
Weight - lbs. (kg)	8.25 (3.71)	10.38 (4.67)	21.6 (9.72)	9.25 (4.16)	11.38 (5.12)	26.8 (12.1)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

4 Channel (406-512 MHz)

	Single Stage			Dual Stage		
ELECTRICAL SPECIFICATIONS	**TBC460-4**	**TCC460-4**	**THC460-4**	**TBD460-4**	**TCD460-4**	**THD460-4**
Frequency Range - MHz	406-512	406-512	406-512	406-512	406-512	406-512
Isolation, Min. Tx-Tx - dB	50	50	50	80	80	80
Isolation, Min. Ant-Tx - dB	28	28	28	53	53	53
Insertion Loss, Max. per Channel - dB	7.1	7.1	7.0	7.4	7.4	7.4
Continuous Power Input, Max. per Channel - Watts	60	125	300	60	125	300
Reflected Power, Max. Allowable from Ant. - Watts	60	150	300	60	150	300
Channel Separation, for Specifications Given - KHz	25	25	25	25	25	25
Temperature Range - °F (°C)			$^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	**TBC460-4**	**TCC460-4**	**THC460-4**	**TBD460-4**	**TCD460-4**	**THD460-4**
Dimensions - in. (mm) W x H x D on 19 in. (483 mm) Rack Tray	19 x 10-1/2 x 14 (483 x 267 x 356)		19 x 16 x 16 (483 x 406 x 406)	19 x 10-1/2 x 14 (483 x 267 x 356)		19 x 16 x 16 (483 x 406 x 406)
Weight - lbs. (kg)	20 (9.0)	27.3 (12.3)	56.3 (25.3)	22 (10)	29.3 (13.2)	67.3 (30.28)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

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Hybrid-Ferrite Transmitter Combiners

2 Channel (806-1000 MHz)

	Single Stage			Dual Stage		
ELECTRICAL SPECIFICATIONS	**TBC800-2**	**TCC800-2**	**THC800-2**	**TBD800-2**	**TCD800-2**	**THD800-2**
Frequency Range - MHz	806-1000	806-1000	806-1000	806-1000	806-1000	806-1000
Isolation, Min. Tx-Tx - dB	50	50	50	80	80	80
Isolation, Min. Ant.-Tx - dB	28	28	28	53	53	53
Insertion Loss, Max. per Channel - dB	3.9	3.9	3.8	4.2	4.2	4.0
Continuous Power Input, Max. per Channel - Watts	60	150	300	60	150	300
Reflected Power, Max. Allowable from Ant. - Watts	60	150	300	60	150	300
Channel Separation, for Specifications Given - KHz	25	25	25	25	25	25
Temperature Range - °F (°C)			$^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	**TBC800-2**	**TCC800-2**	**THC800-2**	**TBD800-2**	**TCD800-2**	**THD800-2**
Dimensions - in. (mm) W x H x D on 19 in. (483 mm) Rack Tray	19 x 3-1/2 x 14 (483 x 89 x 356)		19 x 5-1/4 x 14 (483 x 133 x 356)	19 x 3-1/2 x 14 (483 x 89 x 356)		19 x 5-1/4 x 14 (483 x 133 x 356)
Weight - lbs. (kg)	8.25 (3.71)	10.38 (4.67)	21.3 (9.6)	9.25 (4.2)	11.38 (5.12)	26.8 (21.1)
Connectors	N-Female	N-Female	N-Female	N-Female	N-Female	N-Female

4 Channel (806-1000 MHZ)

	Single Stage			Dual Stage		
ELECTRICAL SPECIFICATIONS	**TBC800-4**	**TCC800-4**	**THC800-4**	**TBD800-4**	**TCD800-4**	**THD800-4**
Frequency Range - MHz	806-1000	806-1000	806-1000	806-1000	806-1000	806-1000
Isolation, Min. Tx-Tx - dB	50	50	50	80	80	80
Isolation, Min. Ant.-Tx - dB	28	28	28	53	53	53
Insertion Loss, Max. per Channel - dB	7.1	7.1	7.0	7.4	7.4	7.2
Continuous Power Input, Max. per Channel - Watts	60	150	300	60	150	300
Reflected Power, Max. Allowable from Ant. - Watts	60	150	300	60	150	300
Channel Separation, for Specifications Given - KHz	25	25	25	25	25	25
Temperature Range - °F (°C)			$^{-}22$ to $^{+}140$ ($^{-}30$ to $^{+}60$)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	**TBC800-4**	**TCC800-4**	**THC800-4**	**TBD800-4**	**TCD800-4**	**THD800-4**
Dimensions - in. (mm) W x H x D on 19 in. (483 mm) Rack Tray	19 x 10-1/2 x 14 (483 x 267 x 356)		19 x 16 x 16 (483 x 406 x406)	19 x 10-1/2 x 14 (483 x 267 x 356)		19 x 16 x 16 (483 x 406 x 406)
Weight - lbs. (kg)	20 (9.0)	27.3 (12.3)	56.3 (25.3)	22 (10)	29.3 (13.2)	67.3 (30.28)
Connectors	N-Female	N-Female	N-Female	N-Female	N-Female	N-Female

CELWAVE RFS
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Hybrid-Ferrite Transmitter Combiners

806-960 MHz

TCD900-5*

***Exact frequency must be specified.**

Designed for the close spaced channels of 900 MHz trunking, these combiners permit maximum use of expensive tower space and considerably reduce the cost of multiple antennas, dedicated cable transmission line and installation. These combiners are expandable, highly compact and accommodate close channel spacing with high isolation. Two of these five channel units can be used along with a PCH800 Hybrid Coupler Panel to combine ten 900 MHz SMR transmit channels.

The TCD900-5 uses CD Series dual isolators to provide 70 dB minimum isolation between inputs.

- **High isolation** — Minimized the possibility of intermodulation.
- **Expandable** — Lowers on-site costs.

ELECTRICAL SPECIFICATIONS	TCD900-5
Frequency Range - MHz	806-960
Isolators per Channel	2
Isolation, Min. Tx-Tx - dB	71; 85 Typical
Isolation, Min. Ant.-Tx - dB	57
Insertion Loss, Max. per Channel - dB	7.9; 7.7 Typical
Continuous Power Input, Max. per Channel - Watts	150
Reflexted Power, Max. Allowable from Ant. - Watts	60
Usable Bandwidth - MHz	50
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)
VSWR, Max. All Ports	1.35:1

MECHANICAL SPECIFICATIONS	TCD900-5
Dimensions - in. (mm) W x H x D on 19 in. (483 mm) Rack Tray	19 x 10-1/2 x 12 (483 x 267 x 305)
Weight - lbs. (kg)	30 (13.5)
Connectors	N-female

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High Power Cellular Combiners

869-894 MHz

RSA880 Series*

***Exact frequency must be specified.**

These combiners are available with or without isolators and offer a modular, 4-channel design that lets you start small and expand easily as your system grows. All meet maximum RSA power output levels and can operate continuously at transmitter outputs of 200 Watts per channel. The patent pending "Barbell" center tuning assembly dissipates high heat, lowers overall internal temperature for optimum frequency stability and minimum insertion loss.

- **Patented "Barbell" tuning assembly** — Long term system reliability.
- **200 Watts/channel input** — RSA 500 Watt ERP levels easier to obtain.
- **Integrated design** — Lower loss, increased system reliability and performance.
- **Temperature compensated** — Ensures consistent performance across temperature and power range.

U.S. PATENT #4,933,652

† Rack and duplexer not included.

ELECTRICAL SPECIFICATIONS	RSA880-4	RSA880-8	RSA880-12	RSA880-16
Frequency Range - MHz	869-894	869-894	869-894	869-894
Bandwidth - MHz	25	25	25	25
Isolation, Min. Tx-Tx - dB	38	38	38	38
Isolation, Min. Ant.-Tx - dB	25	25	25	25
Insertion Loss, Max. per Channel - dB	2.3	2.9	3.1	3.2
Continuous Power Input, Max. per Channel - Watts	200	200	200	200
Reflected Power, Max. Allowable from Ant. - Watts	150	150	150	150
Channel Separation, for Specs Given - MHz	0.63	0.63	0.63	0.63
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	
Input Return Loss, Min. - dB	18	18	18	18
Output Return Loss, Min. - dB	14	14	14	14

MECHANICAL SPECIFICATIONS	RSA880-4	RSA880-8	RSA880-12	RSA880-16
Dimensions - in. (mm) W x H x D	19 x 12-1/4 x 18-1/2 (483 x 311 x 470)	19 x 24-1/2 x 18-1/2 (483 x 622 x 470)	19 x 36-3/4 x 18-1/2 (483 x 933 x 470)	19 x 49 x 18-1/2 (483 x 1244 x 470)
Weight - lbs. (kg)	51 (23)	104 (47)	156 (70)	209 (94)
Connectors	Module Input and Output Connectors are N-female. Junction Output (with 8 or more channels) is LC-female.			

Note: Specifications listed are for single isolator units.

CELWAVE RFS
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Medium Power Cellular Transmitter Combiners

806-1000 MHz

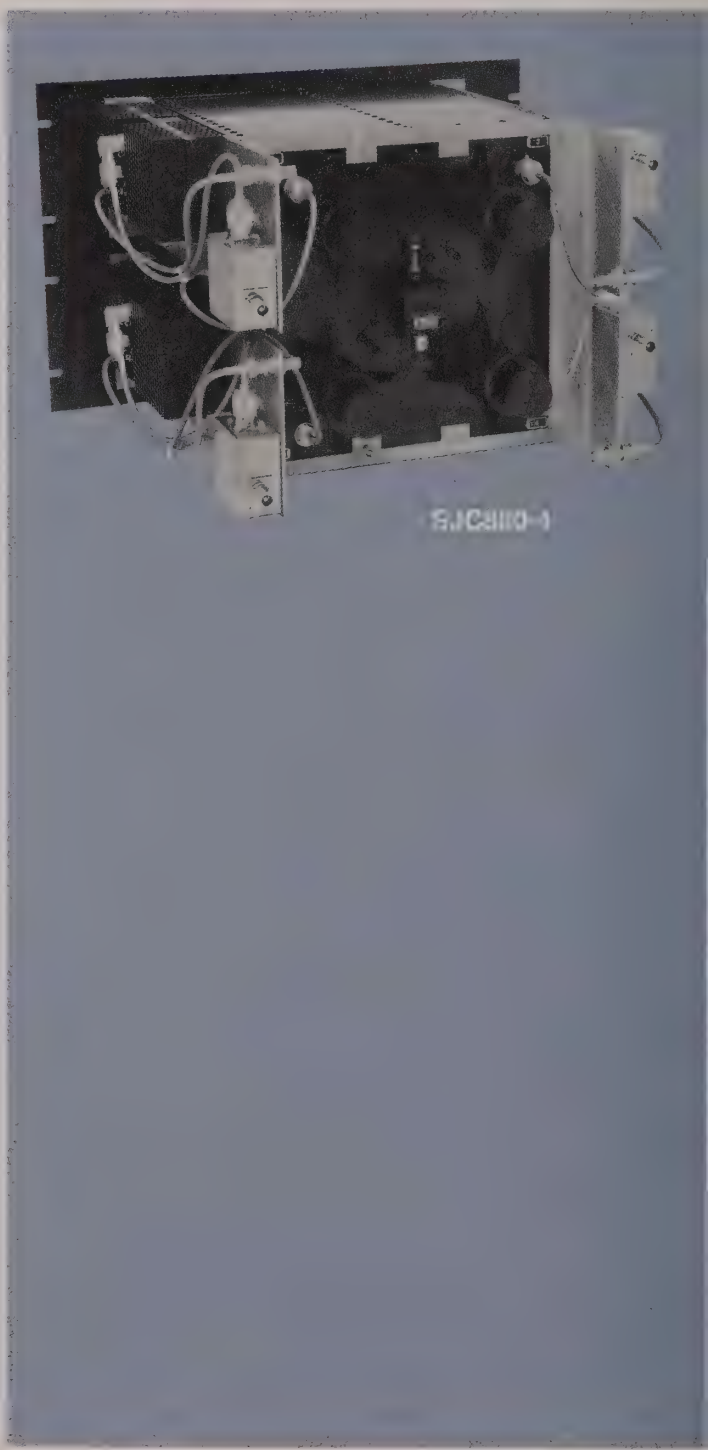
SJ880 Series*

***Exact frequencies must be specified.**

These medium power transmitter combiners are designed for MSA and RSA applications with maximum input power of 75 Watts per channel. A proven performer for SMR operators, the SJ880 Series operates from $^{-}30°$ to $^{+}60°$ Centigrade without frequency drift or degradation. The SJ880 four channel modules are easily field expandable and the 16 channel unit occupies only 49 inches of vertical rack space.

• **Low insertion loss**	Maximizes range, reduces heating.
• **Tuning/sampling port**	Reduces system maintenance.
• **Integrated design**	Increased system performance and reliability.
• **High selectivity**	Maximizes system performance.
• **Medium power**	Ideal for applications where power output does not exceed 75 Watts.

U.S. PATENT #4,933,652



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Medium Power Cellular Transmitter Combiners

ELECTRICAL SPECIFICATIONS	4 Channel w/o Isolators SJ880-4T	4 Channel Single SJC880-4T	4 Channel Dual SJD880-4T	8 Channel w/o Isolators SJ880-8T	8 Channel Single SJC880-8T	8 Channel Dual SJD880-8T
Frequency Range - MHz	806-1000	806-1000	806-1000	806-1000	806-1000	806-1000
Bandwidth - MHz	50	50	50	50	50	50
Isolation, Min. Tx-Tx - dB	13	38	63	13	38	63
Isolation, Min. Ant.-Tx - dB	14	25	50	14	25	50
Insertion Loss, Max. per Channel - dB	1.8	2.1	2.4	2.3	2.6	2.9
Continuous Power Input, Max. per Channel - Watts	75	75	75	75	75	75
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60	60	60	60
Channel Separation, for Specifications Given - MHz	.630	.630	.630	.630	.630	.630
Channel Separation, Min. - KHz	270	270	270	270	270	270
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)			$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	SJ880-4T	SJC880-4T	SJD880-4T	SJ880-8T	SJC880-8T	SJD880-8T
Dimensions - in. (mm) W x H x D	19 x 12-1/4 x 18-1/2 (483 x 311 x 470)	19 x 12-1/4 x 18-1/2 (483 x 311 x 470)	19 x 12-1/4 x 18-1/2 (483 x 311 x 470)	19 x 24-1/2 x 18-1/2 (483 x 622 x 470)	19 x 24-1/2 x 18-1/2 (483 x 622 x 470)	19 x 24-1/2 x 18-1/2 (483 x 622 x 470)
Weight - lbs. (kg)	39 (17.5)	42 (19.1)	45 (20.4)	80 (36)	86 (39)	92 (41.4)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

ELECTRICAL SPECIFICATIONS	12 Channel w/o Isolators SJ880-12T	12 Channel Single SJC880-12T	12 Channel Dual SJD880-12T	16 Channel w/o Isolators SJ880-16T	16 Channel Single SJC880-16T	16 Channel Dual SJD880-16T
Frequency Range - MHz	806-1000	806-1000	806-1000	806-1000	806-1000	806-1000
Bandwidth - MHz	50	50	50	50	50	50
Isolation, Min. Tx-Tx - dB	15	40	65	15	40	65
Isolation, Min. Ant.-Tx - dB	14	27	52	14	27	52
Insertion Loss, Max. per Channel - dB	2.5	2.8	3.1	2.6	2.9	3.2
Continuous Power Input, Max. per Channel - Watts	75	75	75	75	75	75
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60	60	60	60
Channel Separation, for Specifications Given - MHz	.630	.630	.630	.630	.630	.630
Channel Separation, Min. - KHz	270	270	270	270	270	270
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)			$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)		
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	SJ880-12T	SJC880-12T	SJD880-12T	SJ880-16T	SJC880-16T	SJD880-16T
Dimensions - in. (mm) W x H x D	19 x 36-3/4 x 18-1/2 (483 x 933 x 470)	19 x 36-3/4 x 18-1/2 (483 x 933 x 470)	19 x 36-3/4 x 18-1/2 (483 x 933 x 470)	19 x 49 x 18-1/2 (483 x 1245 x 470)	19 x 49 x 18-1/2 (483 x 1245 x 470)	19 x 49 x 18-1/2 (483 x 1245 x 470)
Weight - lbs. (kg)	126 (56.7)	135 (60.7)	144 (64.8)	160 (72)	172 (77.4)	184 (83)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

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Compact Cellular Transmitter Combiners

851-960 MHz

SM880 Series* — Low Power

***Exact frequency must be specified.**

The SM880 series of combiners employ the proven integrated design concept first implemented in our SJ880 series of combiners. The SM880 series is reduced in size to allow two four-channel modules to be placed side by side in a standard 19 inch rack. Their small size allows a complete 16 channel group to be fitted into 10 rack spaces, or 17.5 inches! The four channel modular "building blocks" allow for site growth in four channel increments. Single isolators are used in each channel, but two per channel can be supplied. The SMC models feature single isolators.

• **Modular**	Facilitates on-site expansion.
• **Compatible**	Can be added to most existing combiners.
• **Small size**	Reduces cell site space requirements.
• **Strong and lightweight**	Ease of installation, excellent durability.
• **Integrated design**	Lower loss, improved system performance and MTBF.
• **Temperature compensated**	Assures consistent performance at temperature extremes.

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Compact Cellular Transmitter Combiners

ELECTRICAL SPECIFICATIONS	4 Channel w/o Isolators SM880-4	4 Channel Single Isolators SMC880-4	8 Channel w/o Isolators SM880-8	8 Channel Single Isolators SMC880-8
Frequency Range - MHz	851-960	851-960	851-960	851-960
Bandwidth - MHz Isolator	—	50	—	50
Isolation, Min. Tx-Tx - dB	13	38	13	38
Isolation, Min. Ant.-Tx - dB	—	25	—	25
Insertion Loss, Max. per Channel - dB	2.2	2.5	2.5	2.8
Continuous Power Input, Max. per Channel - Watts	70	70	70	70
Reflected Power, Max. Allowable from Ant. - Watts	—	60	—	60
Channel Separation, for Specifications Given - MHz	.630	.630	.630	.630
Channel Separation, Min. - KHz	.500	.500	.500	.500
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)
Input Return Loss - dB	14	19	14	19
Output Return Loss - dB	14	14	14	14

MECHANICAL SPECIFICATIONS	SM880-4	SMC880-4	SM880-8	SMC880-8
Dimensions - in. (mm) W x H x D	8-3/4 x 8-3/4 x 18 (222 x 222 x 457)	8-3/4 x 8-3/4 x 18 (222 x 222 x 457)	8-3/4 x 17-1/2 x 18 (222 x 444 x 457)	8-3/4 x 17-1/2 x 18 (222 x 444 x 457)
Weight - lbs. (kg)	14 (6.4)	18 (8.2)	28 (12.7)	35.7 (16.2)
Connectors	N-female	N-female	N-female	N-female

ELECTRICAL SPECIFICATIONS	12 Channel w/o Isolators SM880-12	12 Channel Single Isolators SMC880-12	16 Channel w/o Isolators SM880-16	16 Channel Single Isolators SMC880-16
Frequency Range - MHz	851-960	851-960	851-960	851-960
Bandwidth - MHz Isolator	—	50	—	50
Isolation, Min. Tx-Tx - dB	13	38	13	38
Isolation, Min. Ant.-Tx - dB	—	25	—	25
Insertion Loss, Max. per Channel - dB	2.7	3.0	2.9	3.2
Continuous Power Input, Max per Channel - Watts.	70	70	70	70
Reflected Power, Max. Allowable from Ant. - Watts	—	60	—	60
Channel Separation, for Specifications Given - MHz	.630	.630	.630	.630
Channel Separation, Min. - KHz	.500	.500	.500	.500
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)
Input Return Loss - dB	14	19	14	19
Output Return Loss - dB	14	14	14	14

MECHANICAL SPECIFICATIONS	SM880-12	SMC880-12	SM880-16	SMC880-16
Dimensions - in. (mm) W x H x D	17-1/2 x 17-1/2 x 18 (444 x 444 x 457)	17-1/2 x 17-1/2 x 18 (444 x 444 x 457)	17-1/2 x 17-1/2 x 18 (444 x 444 x 457)	17-1/2 x 17-1/12 x 18 (444 x 444 x 457)
Weight - lbs. (kg)	41.5 (19)	53.5 (24.3)	56 (26)	71.5 (32.4)
Connectors	N-female	N-female	N-female	N-female

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Sub-Compact Cellular Tx Combiners

869-960 MHz

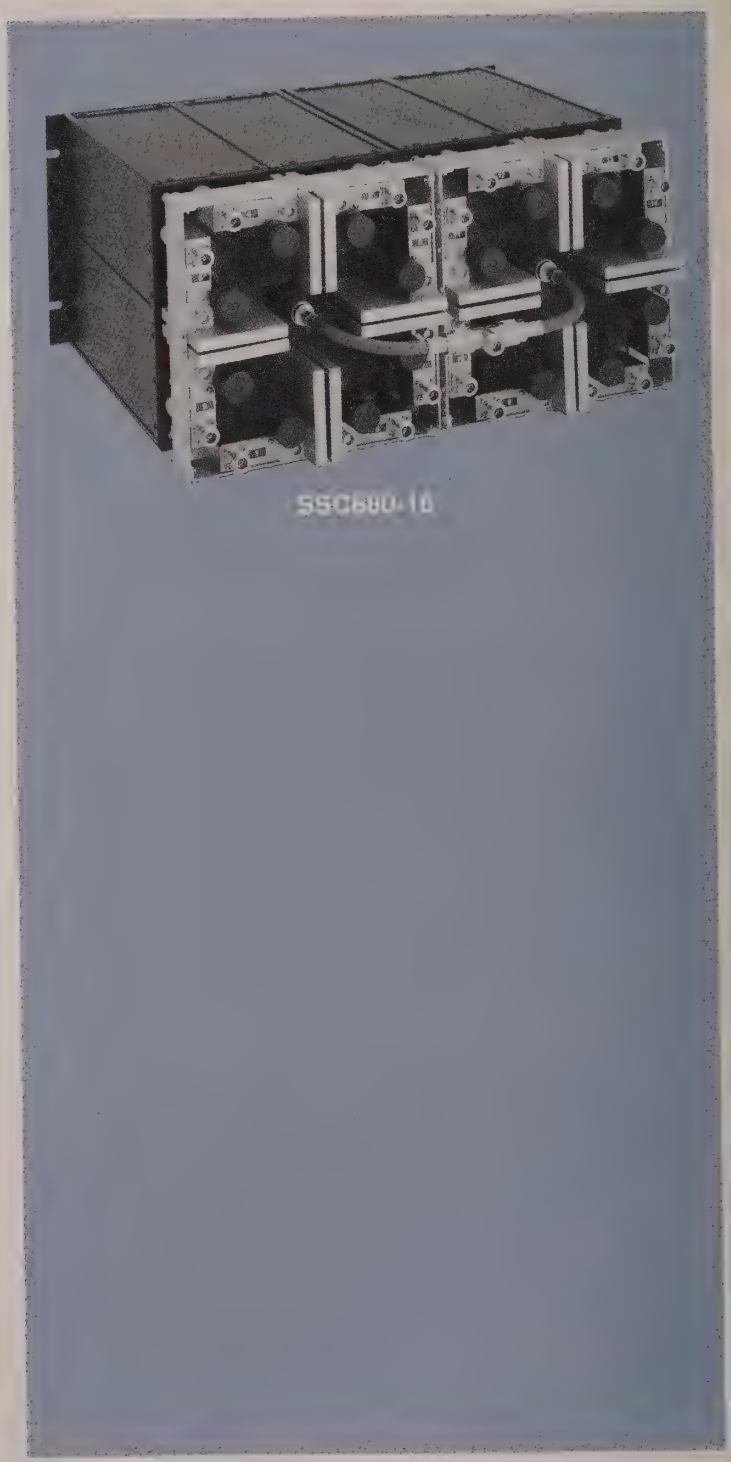
SS880 Series*
SS942 Series*

***Exact frequencies must be specified.**

This series of sub-mini transmitter combiners was designed especially for cellular applications where space is critical. Highly suitable for urban minicell base stations, they are available as 8 and 16 channel basic units or as an 8 channel add-on module. Sixteen channel units occupy only 8.75" in a 19" rack system.

Supplied with or without single stage 25 Watt isolators, these combiners can be tuned for the North American Cellular Band or the European NMT 900 Band and TACS/E-TACS Band. The SSC models are provided with isolators.

• **Ultra compact**	Minimizes use of costly cell site space.
• **Modular**	Facilitates system expansion in the field.
• **Low loss**	Maximizes system performance.
• **Temperature compensated**	Ensures consistent performance at temperature extremes.



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Sub-Compact Cellular Tx Combiners

ELECTRICAL SPECIFICATIONS	8 Channels Without Isolators SS880-8 SS942-8	8 Channels With Isolators SSC880-8 SSC942-8	16 Channels Without Isolators SS880-16 SS942-16	16 Channels With Isolators SSC880-16 SSC942-16
Frequency Range - MHz	869-960	869-960	869-960	869-960
Insertion Losses - dB				
869-894 MHz/630 kHz 25°C	2.90	3.20	3.10	3.40
917-950 MHz/525 kHz 25°C	3.40	3.70	3.70	4.00
935-960 MHz/475 kHz 25°C	3.60	3.90	3.90	4.20
869-894 MHz/630 kHz $^{-}30$ - $^{+}60$°C	3.20	3.50	3.40	3.70
917-950 MHz/525 kHz $^{-}30$ - $^{+}60$°C	3.70	4.00	4.00	4.30
935-960 MHz/475 kHz $^{-}30$ - $^{+}60$°C	3.90	4.20	4.20	4.50
Rated Input Power - Watts	50	50	50	50
Rated Reflect. Power - Watts	—	25	—	25
Input Return Loss $^{-}30$ - $^{+}60$°C - dB	12	19	12	19
Output Return Loss $^{-}30$ - $^{+}60$°C - dB				
@ 630 kHz Spacing	11.0	11.0	9.5	9.5
@ 525 kHz Spacing	10.5	10.5	9.0	9.0
@ 475 kHz Spacing	10.0	10.0	8.5	8.5
Isolation, Tx-Tx - dB	13	38	13	38
Sampling Port Coupling - dB	—	$^{-}35 \pm 2$	—	$^{-}35 \pm 2$
Impedance - Ohms	50	50	50	50
Input/Output Connectors	N-female	N-female	N-female	N-female
Sampling Port Connectors	—	BNC	—	BNC

MECHANICAL SPECIFICATIONS	8 Channels Without Isolators SS880-8 SS942-8	8 Channels With Isolators SSC880-8 SSC942-8	16 Channels Without Isolators SS880-16 SS942-16	16 Channels With Isolators SSC880-16 SSC942-16
Dimensions - in. (mm) W x H x D	19 x 8-3/4 x 18 (483 x 222 x 457)	19 x 8-3/4 x 18 (483 x 222 x 457)	19 x 8-3/4 x 18 (483 x 222 x 457)	19 x 8-3/4 x 18 (483 x 222 x 457)
Weight - lbs. (kg)	28 (13)	39 (18)	54 (24)	76 (34)

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"SMR" Series Trunking Transmitter Combiners

840-960 MHz

SJ880 Series* — Integrated

***Exact frequencies must be specified.**

This series of integrated Transmitter Combiners incorporates a new patent pending technology, enabling 150 Watt Transmitters to be combined with close frequency spacings and still maintain superb frequency stability.

The integrated design takes a minimum amount of vertical rack space, SJ880-5CT only 12-1/2 inches and SJ880-5CS only 15-3/4 inches.

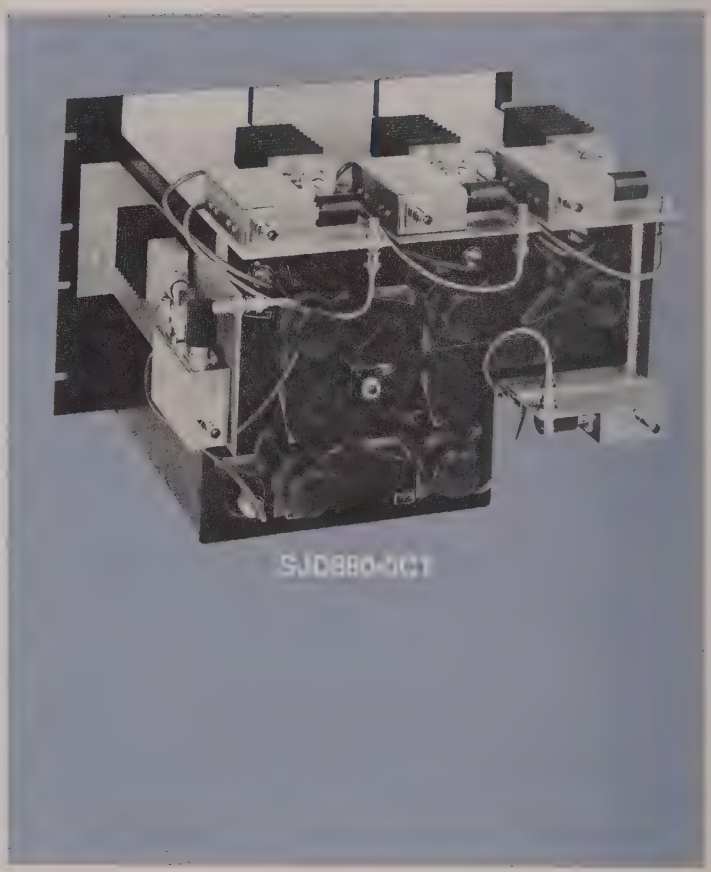
These third generation trunking combiners were designed specifically for the new high power SMR systems. They are comprised of individual electrically connected cavities which share common inner and outer walls to increase combiner reliability.

The SJ880-5CT is supplied with a 60 Watt load termination on the output port of each isolator. The SJ880-5CS is recommended for maximum system protection from excessive reflected power. The SJ880-5CS is supplied with a 150 Watt load termination on the output load of each isolator.

Celwave's "SMR" Series Combiners are available with single (40 dB isolation), dual (65 dB isolation) or triple (90 dB isolation) isolators per channel. The SJ880-5CT or SJ880-5CS may be ordered for 5, 10, 15, or 20 channels. Its 5 channel modular configuration is ideally suited for trunking applications. Because of the "building block" approach to their design, modules may be added easily in the field in order to expand to additional channels.

Note: SJ880-5CT and SJ880-5CS are set at the selectivity required for .5 MHz. When ordering a 5 channel unit, please specify if expansion beyond 10 channels is expected.

U.S. PATENT #4,933,652



• **High isolation**	Minimizes transmitter intermodulation.
• **Compact**	Minimizes use of rack space.
• **Temperature compensated**	Consistent performance across operating temperature and power range.
• **Modular design**	Allows system expansion in the field.
• **Low loss**	Maximizes system performance.
• **Integrated**	Lower loss. Higher MTBF due to elimination of connectors.

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DIVISION OF RADIO FREQUENCY SYSTEMS

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"SMR" Series Trunking Transmitter Combiners

ELECTRICAL SPECIFICATIONS	5 Channel			10 Channel		
	SJC880-5CT SJC880-5CS	SJD880-5CT SJD880-5CS	SJT880-5CT SJT880-5CS	SJC880-10CT SJC880-10CS	SJD880-10CT SJD880-10CS	SJT880-10CT SJT880-10CS
Frequency Range - MHz	840-960	840-960	840-960	840-960	840-960	840-960
Bandwidth - MHz	50	50	50	50	50	50
Isolation, Min. Tx-Tx - dB	40	65	90	40	65	90
Isolation, Min. Ant.-Tx - dB	27	52	77	27	52	77
Insertion Loss, Max. per Channel - dB						
@ .5 MHz Spacing	1.7	2.0	2.3	3.0	3.3	3.6
@ 250 KHz Spacing	3.2	3.5	3.8	4.0	4.3	4.6
Continuous Power Input, Max. per Channel - Watts	150	150	150	150	150	150
Reflected Power, Max. Allowable from Ant.						
– CT	60	60	60	60	60	60
– CS	150	150	150	150	150	150
Channel Separation, Min. - KHz	250	250	250	250	250	250
Temperature Range - °F (°C)			-22 to +140 (-30 to +60)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS		SJC880-5CT SJC880-5CS	SJD880-5CT SJD880-5CS	SJT880-5CT SJT880-5CS	SJC880-10CT SJC880-10CS	SJD880-10CT SJD880-10CS	SJT880-10CT SJT880-10CS
Dimensions - in. (mm) W x H x D							
	– CT	19 x 12-1/4 x 16-3/8 (483 x 311 x 416)			19 x 24-1/2 x 16-3/8 (483 x 622 x 416)		
	– CS	19 x 15-3/4 x 16-3/8 (483 x 400 x 416)			19 x 31-1/2 x 16-3/8 (483 x 800 x 416)		
Weight -lbs. (kg)	– CT	41 (18.6)	45 (20.4)	50 (22.7)	85 (28.6)	93 (42.2)	101 (45.8)
	– CS	51 (23.1)	55 (24.9)	60 (27.2)	105 (47.6)	113 (51.3)	121 (54.9)
Connectors	– Input Port	N-female	N-female	N-female	N-female	N-female	N-female
	– Antenna Port	N-female	N-female	N-female	LC-female	LC-female	LC-female

ELECTRICAL SPECIFICATIONS	15 Channel			20 Channel		
	SJC880-15CT SJC880-15CS	SJD880-15CT SJD880-15CS	SJT880-15CT SJT880-15CS	SJC880-20CT SJC880-20CS	SJD880-20CT SJD880-20CS	SJT880-20CT SJT880-20CS
Frequency Range - MHz	840-960	840-960	840-960	840-960	840-960	840-960
Bandwidth - MHz	50	50	50	50	50	50
Isolation, Min. Tx-Tx - dB	40	65	90	40	65	90
Isolation, Min. Ant.-Tx - dB	27	52	77	27	52	77
Insertion Loss, Max. per Channel - dB						
@ 250 KHz Spacing	4.4	4.7	5.0	4.6	4.9	5.2
Continuous Power Input, Max. per Channel - Watts	150	150	150	150	150	150
Reflected Power, Max. Allowable from Ant.						
– CT	60	60	60	60	60	60
– CS	150	150	150	150	150	150
Channel Separation, Min. - KHz	250	250	250	250	250	250
Temperature Range - °F (°C)			-22 to +140 (-30 to +60)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS		SJC880-15CT SJC880-15CS	SJD880-15CT SJD880-15CS	SJT880-15CT SJT880-15CS	SJC880-20CT SJC880-20CS	SJD880-20CT SJD880-20CS	SJT880-20CT SJT880-20CS
Dimensions - in. (mm) W x H x D							
	– CT	19 x 36-3/4 x 16-3/8 (483 x 934 x 416)			19 x 49 x 16-3/8 (483 x 1245 x 416)		
	– CS	19 x 47-1/4 x 16-3/8 (483 x 1200 x 416)			19 x 63 x 16-3/8 (483 x 1600 x 416)		
Weight -lbs. (kg)	– CT	126 (57.2)	138 (62.6)	151 (68.5)	167 (75.8)	183 (83.0)	201 (91.2)
	– CS	156 (70.8)	168 (76.2)	181 (82.1)	207 (93.9)	223 (101.2)	241 (109.3)
Connectors	– Input Port	N-female	N-female	N-female	N-female	N-female	N-female
	– Antenna Port	LC-female	LC-female	LC-female	LC-female	LC-female	LC-female

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Cavity-Ferrite Transmitter Combiners

806-1000 MHz

TJ800 Series* — Modular

***Exact frequencies must be specified.**

These Celwave combiners couple several transmitters into one antenna to reduce the direct costs of multiple antenna installations. Each uses a single, dual or triple isolator junctioned with a precisely tuned copper cavity.

The TJ Series are modular, multi channel units specifically designed for continuous duty in 800 MHz trunking and conventional systems. The TJ Series is provided with either a 60 Watt or 150 Watt load termination (T and S suffix respectively) on the output load port of each isolator for maximum system protection from excessive reflected power in the event of transmission line failure at the output of the combiner.

• **Allows combining of two or more transmitters**	Maximizes use of tower space, reduces cost.
• **Low loss**	Maximizes system performance.
• **Modular**	Simple, economical on-site expandability.
• **Temperature compensated**	Ensures consistent performance across temperature and power range.

U.S. PATENT #4,933,652

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Cavity-Ferrite Transmitter Combiners

ELECTRICAL SPECIFICATIONS	2 Channel Single Stage TJC800-2T TJC800-2S	2 Channel Dual Stage TJD800-2T TJD800-2S	2 Channel Triple Stage TJT800-2T TJT800-2S	3 Channel Single Stage TJC800-3T TJC800-3S	3 Channel Dual Stage TJD800-3T TJD800-3S	3 Channel Triple Stage TJT800-3T TJT800-3S
Frequency Range - MHz	806-1000	806-1000	806-1000	806-1000	806-1000	806-1000
Bandwidth - MHz	50	50	50	50	50	50
Isolation, Min. Tx-Tx - dB	35	60	85	35	60	85
Isolation, Min. Ant.-Tx - dB	25	50	75	25	50	75
Insertion Loss, Max. per Channel - dB	1.75	2.15	2.45	1.80	2.20	2.50
Continuous Power Input, Max. per Channel - Watts	150	150	150	150	150	150
Reflected Power, Max. Allowable from Ant. - Watts	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150
Channel Separation, for Specifications Given - MHz	1.00	1.00	1.00	1.00	1.00	1.00
Channel Separation, Min. - KHz	250	250	250	250	250	250
Temperature Range - °F (°C)			-22 to +140 (-30 to +60)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TJC800-2T TJC800-2S	TJD800-2T TJD800-2S	TJT800-2T TJT800-2S	TJC800-3T TJC800-3S	TJD800-3T TJD800-3S	TJT800-3T TJT800-3S
Dimensions - in. (mm) W x H x D	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)
Weight - lbs. (kg)	(-T) 26 (9.6) (-S) 30 (13.6)	(-T) 30 (13.6) (-S) 34 (15.4)	(-T) 32 (14.5) (-S) 36 (16.3)	(-T) 32 (14.5) (-S) 38 (17.2)	(-T) 38 (17.2) (-S) 44 (19.9)	(-T) 41 (18.6) (-S) 47 (21.3)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

ELECTRICAL SPECIFICATIONS	4 Channel Single Stage TJC800-4T TJC800-4S	4 Channel Dual Stage TJD800-4T TJD800-4S	4 Channel Triple Stage TJT800-4T TJT800-4S	5 Channel Single Stage TJC800-5T TJC800-5S	5 Channel Dual Stage TJD800-5T TJD800-5S	5 Channel Triple Stage TJT800-5T TJT800-5S
Frequency Range - MHz	806-1000	806-1000	806-1000	806-1000	806-1000	806-1000
Bandwidth - MHz	50	50	50	50	50	50
Isolation, Min. Tx-Tx - dB	35	60	85	35	60	85
Isolation, Min. Ant.-Tx - dB	25	50	75	25	50	75
Insertion Loss, Max. per Channel - dB	1.85	2.25	2.55	1.9	2.3	2.6
Continuous Power Input, Max. per Channel - Watts	150	150	150	150	150	150
Reflected Power, Max. Allowable from Ant. - Watts	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150
Channel Separation, for Specifications Given - MHz	1.00	1.00	1.00	1.00	1.00	1.00
Channel Separation, Min. - KHz	250	250	250	250	250	250
Temperature Range - °F (°C)			-22 to +140 (-30 to +60)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TJC800-4T TJC800-4S	TJD800-4T TJD800-4S	TJT800-4T TJT800-4S	TJC800-5T TJC800-5S	TJD800-5T TJD800-5S	TJT800-5T TJT800-5S
Dimensions - in. (mm) W x H x D	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)	19 x 26-1/4 x 16 (483 x 667 x 406)
Weight - lbs. (kg)	(-T) 43 (19.5) (-S) 51 (23.1)	(-T) 51 (23.1) (-S) 59 (26.8)	(-T) 56 (25.4) (-S) 64 (29.0))	(-T) 53 (24.0) (-S) 63 (28.6)	(-T) 61 (27.7) (-S) 71 (32.2)	(-T) 67 (30.4) (-S) 77 (34.9)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

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Cavity-Ferrite Transmitter Combiners

ELECTRICAL SPECIFICATIONS	8 Channel Single Stage TJC800-8T TJC800-8S	8 Channel Dual Stage TJD800-8T TJD800-8S	8 Channel Triple Stage TJT800-8T TJT800-8S	10 Channel Single Stage TJC800-10T TJC800-10S	10 Channel Dual Stage TJD800-10T TJD800-10S	10 Channel Triple Stage TJT800-10T TJT800-10S
Frequency Range - MHz	806-1000	806-1000	806-1000	806-1000	806-1000	806-1000
Bandwidths - MHz	50	50	50	50	50	50
Isolation, Min. Tx-Tx - dB	35	60	85	35	60	85
Isolation, Min. Ant.-Tx - dB	25	50	75	25	50	75
Insertion Loss, Max. per Channel - dB	2.9	3.5	3.8	3.0	3.3	3.6
Continuous Power Input, Max. per Channel - Watts	150	150	150	150	150	150
Reflected Power, Max. Allowable from Ant. - Watts	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150	(-T) 60 (-S) 150
Channel Separation, for Specifications Given - MHz	1.00	1.00	1.00	.500	.500	.500
Channel Separation, Min. - KHz	250	250	250	250	250	250
Temperature Range - °F (°C)			-22 to +140 (-30 to +60)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TJC800-8T TJC800-8S	TJD800-8T TJD800-8S	TJT800-8T TJT800-8S	TJC800-10T TJC800-10S	TJD800-10T TJD800-10S	TJT800-10T TJT800-10S
Dimensions - in. (mm) W x H x D	19 x 52-1/2 x 16 (483 x 1334 x 406)	19 x 52-1/2 x 16 (483 x 1334 x 406)	19 x 52-1/2 x 16 (483 x 1334 x 406)	19 x 52-1/2 x 16 (483 x 1334 x 406)	19 x 52-1/2 x 16 (483 x 1334 x 406)	19 x 52-1/2 x 16 (483 x 1334 x 406)
Weight - lbs. (kg)	(-T) 85 (38.6) (-S) 101 (45.8)	(-T) 101 (45.8) (-S) 117 (53.1)	(-T) 111 (50.3) (-S) 127 (67.6)	(-T) 106 (48.0) (-S) 126 (57.2)	(-T) 122 (55.3) (-S) 142 (64.4)	(-T) 134 (60.8) (-S) 154 (69.9)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

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Cavity-Ferrite Transmitter Combiners

406-512 MHz

TJ460 Series* **6 Inch Cavity**
TL460 Series* **8" High Selectivity**
*** Exact frequencies must be specified.**

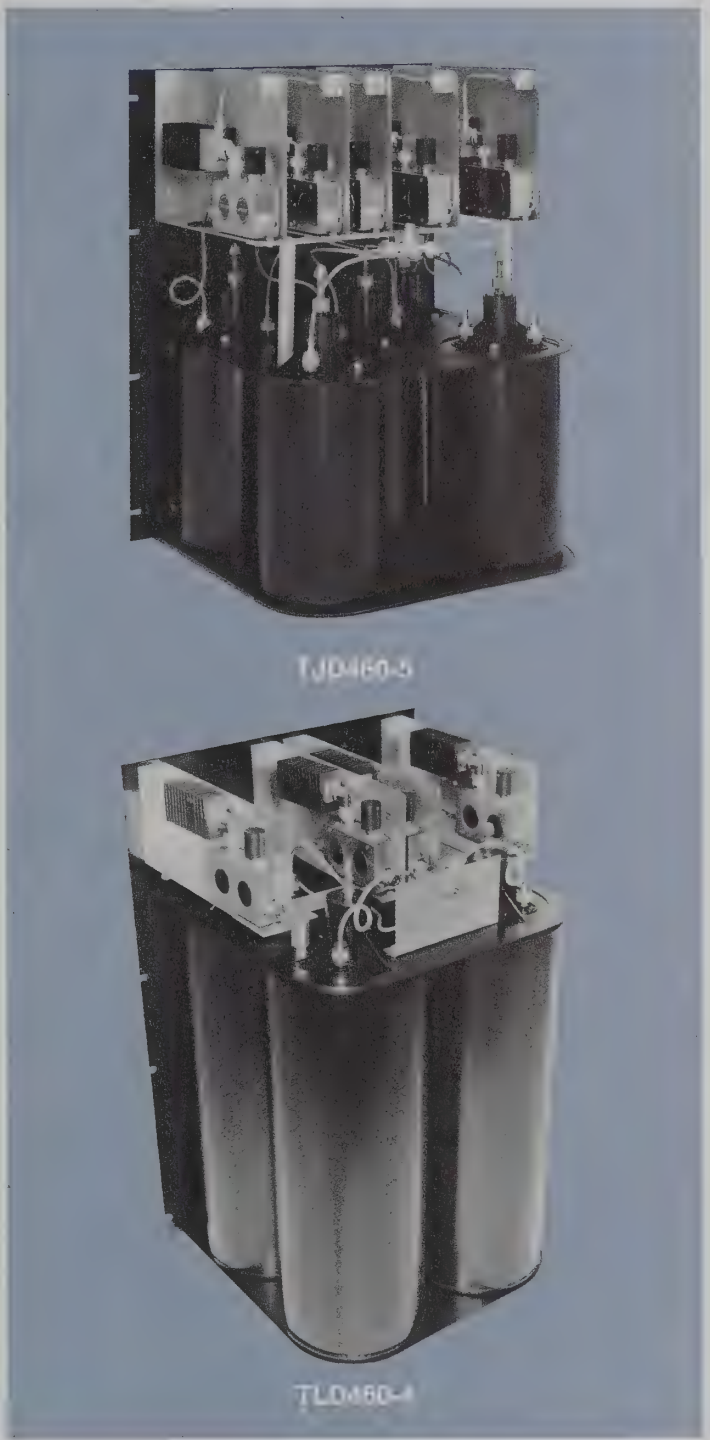
Each of these Celwave units uses a precision-tuned copper cavity in combination with a single, dual or triple isolator.

The TJ Series can couple multiple transmitters to one antenna when frequency separation is at least 250 KHz. These factory tuned combiners are available in either 2, 3, 4, 5, or 10 channel versions and may be easily expanded up to 20 channels in the field. They provide maximum Q, excellent heat transfer and the lowest possible insertion loss.

The TL Series is used to couple multiple transmitters to one antenna in the 406-512 MHz frequency range, minimum separation is recommended at 150 KHz. Featuring our PD5013-A eight inch optimized Q cavity and single, dual or triple isolator, these combiners provide the lowest possible loss per channel and the greatest amount of transmitter noise protection for receivers. High power units are available. Contact our Customer Service Department for details.

- **Low loss** — Maximizes system performance.
- **High isolation** — Minimizes possibility of intermodulation.
- **Modular** — Easily expandable in the field.
- **Fully temperature compensated** — Ensures consistent performance across temperature and power range.

Field Expansion – To combine multiple cavities requires additional modules and frequency dependent cable harness. Both new and old frequencies must be specified.



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Cavity-Ferrite Transmitter Combiners

ELECTRICAL SPECIFICATIONS	2 Channel Single Stage TJC460-2	2 Channel Dual Stage TJD460-2	2 Channel Triple Stage TJT460-2	3 Channel Single Stage TJC460-3	3 Channel Dual Stage TJD460-3	3 Channel Triple Stage TJT460-3
Frequency Range - MHz	406-512	406-512	406-512	406-512	406-512	406-512
Bandwidth - MHz	12 - All Models					
Isolation, Min. Tx-Tx - dB	35	60	85	35	60	85
Isolation, Min. Ant.-Tx - dB	25	50	75	25	50	75
Insertion Loss, Max. per Channel - dB @ 250 KHz @ 500 KHz	3.1 2.8	3.5 3.2	3.9 3.6	3.2 2.7	3.6 3.1	4.0 3.5
Continuous Power Input, Max. per Channel - Watts	125	125	125	125	125	125
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60	60	60	60
Channel Separation, Min. - KHz	250	250	250	250	250	250
Temperature Range - °F (°C)	-22 to +140 (-30 to +60)					
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TJC460-2	TJD460-2	TJT460-2	TJC460-3	TJD460-3	TJT460-3
Dimensions - in. (mm) W x H x D	19 x 24 x 16 (483 x 610 x 406)					
Weight - lbs. (kg)	33 (15.0)	36 (16.3)	38.4 (17.4)	39 (17.7)	44 (20.0)	47.6 (21.6)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

4 Channel ELECTRICAL SPECIFICATIONS	Single Stage TJC460-4	Single Stage TLC460-4	Dual Stage TJD460-4	Dual Stage TLD460-4	Triple Stage TJT460-4	Triple Stage TLT460-4
Frequency Range - MHz	406-512	406-512	406-512	406-512	406-512	406-512
Bandwidth - MHz	12 - All Models					
Isolation, Min. Tx-Tx - dB	35	35	60	60	85	85
Isolation, Min. Ant.-Tx - dB	25	25	50	50	75	75
Insertion Loss, Max. per Channel - dB @ 250 KHz (500 KHz) @ 150 KHz (250 KHz)	3.3 (2.8) —	— 2.9 (2.5)	3.7 (3.27) —	— 3.3 (2.9)	4.2 (3.7) —	— 3.7 (3.3)
Continuous Power Input, Max. per Channel - Watts	125	125	125	125	125	125
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60	60	60	60
Channel Separation, Min. - KHz	250	150	250	150	250	150
Temperature Range - °F (°C)	-22 to +140 (-30 to +60)					
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TJC460-4	TLC460-4	TJD460-4	TLD460-4	TJT460-4	TLT460-4
Dimensions - in. (mm) W x H x D	19 x 24 x 16 (483 x 610 x 406)	19 x 29-3/4 x 17 (483 x 756 x 432)	19 x 24 x 16 (483 x 610 x 406)	19 x 29-3/4 x 17 (483 x 756 x 432)	19 x 24 x 16 (483 x 610 x 406)	19 x 29-3/4 x 17 (483 x 755 x 432)
Weight - lbs. (kg)	46 (20.9)	83 (37.7)	52 (23.6)	91 (41.3)	56.8 (25.8)	97 (44.0)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

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Cavity-Ferrite Transmitter Combiners

ELECTRICAL SPECIFICATIONS	5 Channel Single Stage TJC460-5	5 Channel Dual Stage TJD460-5	5 Channel Triple Stage TJT460-5
Frequency Range - MHz	406-512	406-512	406-512
Bandwidth - MHz		12 - All Models	
Isolation, Min. Tx-Tx - dB	35	60	85
Isolation, Min. Ant.-Tx - dB	25	50	75
Insertion Loss, Max. per Channel - dB @ 250 KHz @ 500 KHz	3.4 2.7	3.8 3.1	4.3 3.6
Continuous Power Input, Max. per Channel - Watts	125	125	125
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60
Channel Separation, Min. - KHz	250	250	250
Temperature Range - °F (°C)		$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)	
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TJC460-5	TJD460-5	TJT460-5
Dimensions - in. (mm) W x H x D		19 x 24 x 16 (483 x 610 x 406)	
Weight - lbs. (kg)	53 (24.0)	61 (27.7)	67 (30.4)
Connectors	N-female	N-female	N-female

ELECTRICAL SPECIFICATIONS	8 Channel Single Stage TLC460-8	8 Channel Dual Stage TLD460-8	8 Channel Triple Stage TLT460-8	10 Channel Single Stage TJC460-10	10 Channel Dual Stage TJD460-10	10 Channel Triple Stage TJT460-10
Frequency Range - MHz	406-512	406-512	406-512	406-512	406-512	406-512
Bandwidth - MHz			12 - All Models			
Isolation, Min. Tx-Tx - dB	35	60	85	35	60	85
Isolation, Min. Ant.-Tx - dB	25	50	75	25	50	75
Insertion Loss, Max. per Channel - dB @ 250 KHz (500 KHz) @ 150 KHz (250 KHz)	— 3.4 (3.0)	— 3.8 (3.4)	— 4.2 (3.8)	3.8 (3.1) —	4.2 (3.5) —	4.7 (4.0) —
Continuous Power Input, Max. per Channel - Watts	125	125	125	125	125	125
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60	60	60	60
Channel Separation, Min. - KHz	150	150	150	250	250	250
Temperature Range - °F (°C)			$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)			
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TLC460-8	TLD460-8	TLT460-8	TJC460-10	TJD460-10	TJT460-10
Dimensions - in. (mm) W x H x D	19 x 59-1/2 x 17 (483 x 1511 x 432)			19 x 48 x 16 (483 x 1219 x 406)		
Weight - lbs. (kg)	166 (75.4)	182 (82.6)	194 (88.0)	106 (48.1)	122 (55.3)	134 (60.8)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

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Cavity-Ferrite Transmitter Combiners

136-174 / 279-281 MHz

TJ150 Series*	**6 Inch Cavity High Selectivity**
TL150 Series*	**8 Inch Cavity**
TL280 Series*	**8 Inch Cavity**

***Exact frequencies must be specified.**

Each of these Celwave cavity-ferrite combiners utilizes a precisely tuned copper cavity junctioned with our single, dual or triple isolator. They are designed to couple several transmitters into one antenna.

The TJ Series is available in either 2, 3, 4 or 5 channel units or in multiples of up to 20 channels. Minimum channel spacing is 120 KHz. The TJ Series is designed for maximum Q, excellent heat transfer and the lowest possible insertion loss. Each unit is factory tuned and mounted on a standard 19 inch rack panel.

The TL Series is used to couple multiple transmitters with a minimum frequency spacing of 75 KHz to one antenna with the lowest possible loss per channel. Higher power units are available. Contact our Customer Service Department for details.

• **Allows combining of two or more transmitters**	Maximizes use of tower space, reduces costs.
• **High isolation**	Minimizes intermodulation.
• **Modular**	Simplifies on-site expandability.
• **Fully temperature compensated**	Ensures consistent performance across temperature and power range.

Field Expansion - To combine multiple cavities requires additional modules and frequency dependent cable harness. Both new and old frequencies must be specified.

CELWAVE RFS
DIVISION OF RADIO FREQUENCY SYSTEMS

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Cavity-Ferrite Transmitter Combiners

ELECTRICAL SPECIFICATIONS	2 Channel Single Stage TJC150-2	2 Channel Dual Stage TJD150-2	2 Channel Triple Stage TJT150-2	3 Channel Single Stage TJC150-3	3 Channel Dual Stage TJD150-3	3 Channel Triple Stage TJT150-3
Frequency Range - MHz	136-174	136-174	136-174	136-174	136-174	136-174
Bandwidth - MHz	4 - All Models					
Isolation, Min. Tx-Tx - dB	35	60	85	35	60	85
Isolation, Min. Ant.-Tx - dB	25	50	75	25	50	75
Insertion Loss, Max. per Channel - dB	2.4	2.8	3.4	2.5	2.9	3.5
Continuous Power Input, Max. per Channel - Watts	125	125	125	125	125	125
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60	60	60	60
Channel Separation, for Specifications Given - KHz	120	120	120	120	120	120
Channel Separation, Min. - KHz	120	120	120	120	120	120
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)					
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TJC150-2	TJD150-2	TJT150-2	TJC150-3	TJD150-3	TJT150-3
Dimensions - in. (mm) W x H x D	19 x 35 x 16 (483 x 889 x 406)					
Weight - lbs. (kg)	42 (19.0)	45 (20.4)	47.5 (21.5)	61 (27.7)	66 (30.0)	69.6 (31.6)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

4 Channel ELECTRICAL SPECIFICATIONS	Single Stage TJC150-4	Single Stage TLC150-4	Single Stage TLC280-4	Dual Stage TJD150-4	Dual Stage TLD150-4	Dual Stage TLD280-4
Frequency Range - MHz	136-174	136-174	279-281	136-174	136-174	279-281
Bandwidth - MHz	4 - All Models					
Isolation, Min. Tx-Tx - dB	35	35	38	60	60	63
Isolation, Min. Ant.-Tx - dB	25	25	25	50	50	50
Insertion Loss, Max. per Channel - dB	2.6	3.1	3.1	3.0	3.5	3.5
Continuous Power Input, Max. per Channel - Watts	125	125	125	125	125	125
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60	60	60	60
Channel Separation, for Specifications Given - KHz	120	75	125	120	100	125
Channel Separation, Min. - KHz	120	75	75	120	75	75
Temperature Range - °F (°C)	$^{-}$22 to $^{+}$140 ($^{-}$30 to $^{+}$60)					
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TJC150-4	TLC150-4	TLC280-4	TJD150-4	TLD150-4	TLD280-4
Dimensions - in. (mm) W x H x D	19 x 35 x 16 (483 x 889 x 406)	19 x 29-3/4 x 17 (483 x 756 x 432)	19 x 24-1/2 x 17 (483 x 622 x 432)	19 x 35 x 16 (483 x 889 x 406)	19 x 29-3/4 x 17 (483 x 756 x 432)	19 x 24-1/2 x 17 (483 x 622 x 432)
Weight - lbs. (kg)	71 (32.2)	83 (37.7)	53 (24)	78 (35.4)	91 (41.3)	61 (27.5)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

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Cavity-Ferrite Transmitter Combiners

ELECTRICAL SPECIFICATIONS	4 Channel Triple Stage TJT150-4	4 Channel Triple Stage TLT150-4	5 Channel Single Stage TJC150-5	5 Channel Dual Stage TJD150-5	5 Channel Triple Stage TJT150-5
Frequency Range - MHz	136-174	136-174	136-174	136-174	136-174
Bandwidth - MHz	4 - All Models			4 - All Models	
Isolation, Min. Tx-Tx - dB	85	85	35	60	85
Isolation, Min. Ant.-Tx - dB	75	75	25	50	75
Insertion Loss, Max. per Channel - dB	3.6	3.9	2.7	3.1	3.7
Continuous Power Input, Max. per Channel - Watts	125	125	125	125	125
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60	60	60
Channel Separation, for Specifications Given - KHz	120	100	120	120	120
Channel Separation, Min. - KHz	120	75	120	120	120
Temperature Range - °F (°C)	-22 to +140 (-30 to +60)			-22 to +140 (-30 to +60)	
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TJT150-4	TLT150-4	TJC150-5	TJD150-5	TJT150-5
Dimensions - in. (mm) W x H x D	19 x 35 x 16 (483 x 889 x 406)	19 x 29-3/4 x 17 (483 x 756 x 432)	19 x 35 x 16 (483 x 889 x 406)	19 x 35 x 16 (483 x 889 x 406)	19 x 35 x 16 (483 x 889 x 406)
Weight - lbs. (kg)	83 (37.6)	97 (44.0)	83 (37.7)	91 (41.3)	97 (44.0)
Connectors	N-female	N-female	N-female	N-female	N-female

ELECTRICAL SPECIFICATIONS	8 Channel Single Stage TLC150-8	8 Channel Dual Stage TLD150-8	8 Channel Triple Stage TLT150-8	10 Channel Single Stage TJC150-10	10 Channel Dual Stage TJD150-10	10 Channel Triple Stage TJT150-10
Frequency Range - MHz	136-174	136-174	136-174	136-174	136-174	136-174
Bandwidth - MHz	4 - All Models					
Isolation, Min. Tx-Tx - dB	35	60	85	35	60	85
Isolation, Min. Ant.-Tx - dB	25	50	75	25	50	75
Insertion Loss, Max. per Channel - dB	3.5	3.9	4.3	3.4	3.8	4.3
Continuous Power Input, Max. per Channel - Watts	125	125	125	125	125	125
Reflected Power, Max. Allowable from Ant. - Watts	60	60	60	60	60	60
Channel Separation, for Specifications Given - KHz	100	100	100	120	120	120
Channel Separation, Min. - KHz	75	75	75	120	120	120
Temperature Range - °F (°C)	-22 to +140 (-30 to +60)			-22 to +140 (-30 to +60)		
VSWR, Max. All Ports	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1	1.25:1

MECHANICAL SPECIFICATIONS	TLC150-8	TLD150-8	TLT150-8	TJC150-10	TJD150-10	TJT150-10
Dimensions - in. (mm) W x H x D	19 x 60 x 16 (483 x 1524 x 406)			19 x 70 x 16 (483 x 1778 x 406)		
Weight - lbs. (kg)	166 (75.3)	182 (82.6)	194 (87.9)	166 (75.3)	182 (82.6)	194 (87.9)
Connectors	N-female	N-female	N-female	N-female	N-female	N-female

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Transmitter Combiner Expansion Kits

Cavity-Ferrite Combiner Channel Expansion Kits

PD656250 for TJD800-2T, 3T, 4T
The three-quarter wave cavity-ferrite transmitter combiners are available in models with fewer than five channels and can be expanded using one PD656250 kit per additional channel.

PD656250 includes:

1. One PD3406 three-quarter wave cavity and cable assembly.
2. One CD800-B dual isolator (60 Watt load) with mounting hardware.
3. Complete installation instructions.

The cavity and isolator are factory tuned to the new channel frequency. Some minor tuning adjustments to the new and existing cavities may be required for optimum performance after installation and are detailed in the instructions. Please specify new and existing frequencies when ordering. Net weight 10 lbs.

Similar expansion kits are available with a single (CC800-B) or triple (CT800-B) isolator in place of the dual isolator.

PD656230 for TJD800-2S, 3S, 4S
Similar to the PD656250 except that a CD800-C isolator, with a 150 Watt load is used to expand the -5S style transmitter combiner. Net weight 23 lbs.

Expansion Kits for TJ150 and TL150 Series, TJ460 and TL460 Series
Consult our Customer Service Department for detailed specifications.

PD656940 Phasing Harness
For expansion from 5 to 10 channel (SJ Series).

Hybrid-Ferrite Combiner Expansion Kit

The TB800, TC800 and TH800 Series Hybrid-Ferrite transmitter combiner are easily expandable with the addition of:

1. One CAB-1 Cable Assembly.
2. One PBH800 (for 60 Watt Tx power) or one PCH800 (for 125 Watt Tx power) Coupler Panel.
3. One two channel tray, special one channel options available.

Note: With the addition of each coupler panel the maximum insertion loss will increase by approximately 3.2 dB. Expansion Kits are also available for the TB, TC and TH (070,150 and 460) Series. Consult with our Customer Service Department for detailed specifications.

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Power Monitor/Directional Coupler

66-1000 MHz

Guardian Series
DCG1*, DCG2*

***Exact frequencies must be specified.**
See Ordering Numbers on next page.

Celwave's Guardian Power Monitors measure transmitter output power, antenna forward power, antenna reflected power, and VSWR.

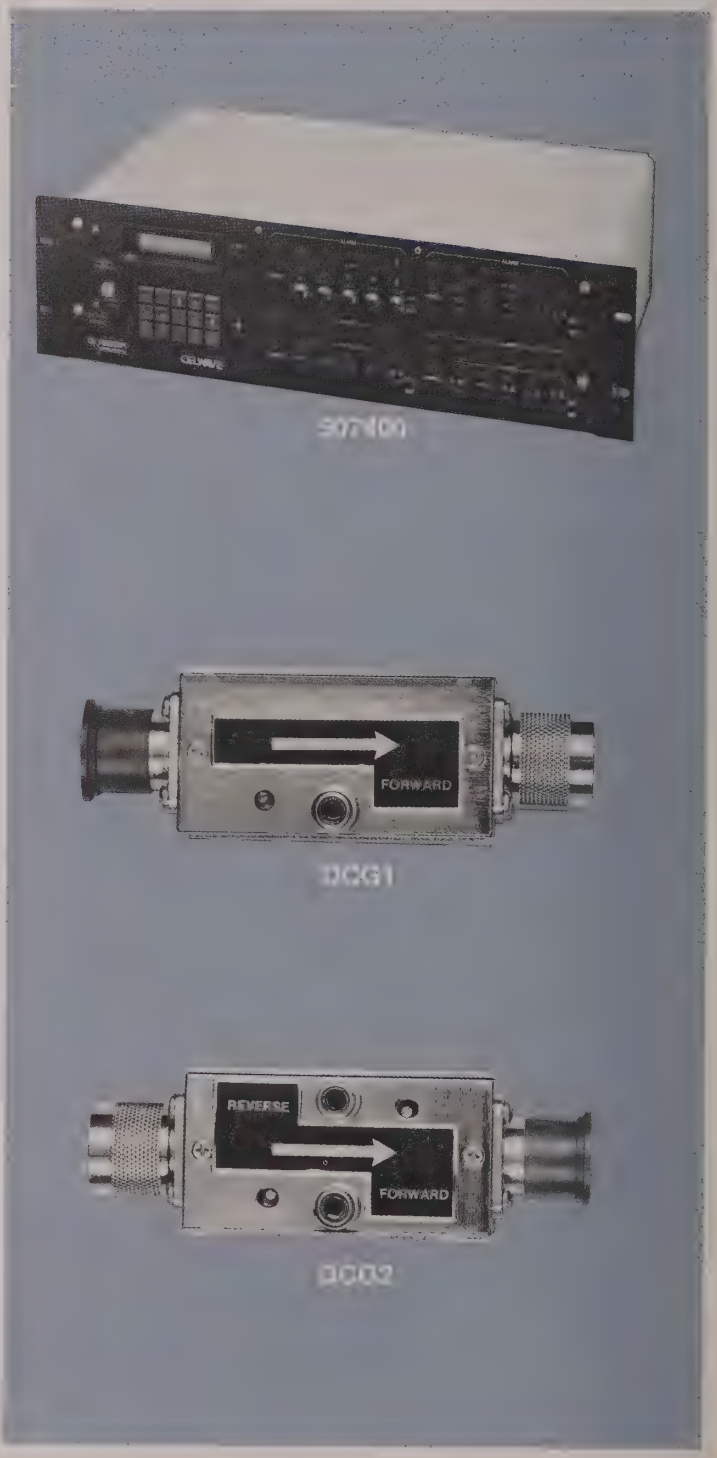
Fully programmable, the Guardian allows you to program alarm levels for individual channel low power levels and individual antenna high VSWR with a 15-button keyboard. A 16-character LCD display permits on-site monitoring of the selected transmitter or antenna.

Model #507400 monitors up to 5 transmit channels and 1 antenna. Three additional models are available to suit your system configuration – up to 20 transmit channels and 4 antennas.

A single directional coupler (DCG1) is required for each transmit channel; a dual directional coupler (DCG2) for each antenna connection. Both couplers are available from 66 to 1000 MHz. To order, contact our Customer Service Department.

• **Fully programmable**	Allows programming of alarm levels for up to 20 channels and antennas.
• **LCD display**	Permits on-site monitoring.
• **Multi-measurements**	Measures transmitter output power, antenna reflected power and VSWR.

GUARDIAN
POWER MONITOR



CELWAVE RFS
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Power Monitor/Directional Coupler

SPECIFICATIONS	ALL MODELS
Frequency Range - MHz	66-1000
Display	
Actual Power	Resolution
to .1 of Watt	0.1-9.9W
to 1 Watt	10-500W
VSWR	1.00-9.99
Accuracy (with Couplers)	
Transmit Power 0.1-4.9W	±0.5W
Transmit Power 5.0-250W	±5%
Antenna Forward Power 5.0-250W	±10%
VSWR (with Antenna Forward Power >.5W)	±10%
Programmable Levels	
Transmit Power	0-250W
VSWR Alarm	1.00-3.50
Number of Antennas	1-4
Number of Transmitters	1-20
Dimensions - W x H x D (Minus Cables)	19" x 5.25" x 11"
DC Power Supply	10-14 VDC at 1.5 amps

GUARDIAN POWER MONITOR

Ordering information - Power Monitor

Item No.	Total Antennas	Total Transmitters	Configuration
507400	1	5	1Ax5T
507390	2	10	2Ax5T 1Ax10T
507380	3	15	3Ax5T 1Ax10T + 1Ax5T 1Ax15T
507370	4	20	4Ax5T 2Ax10T 4Ax15T + 1Ax5T

A= Maximum number of Antennas. T= Maximum number of Transmitters.

Ordering Information - Directional Coupler

Item No.	Frequency Range - MHz
DCG1-070	66-88
DCG1-150	132-174
DCG1-460	406-512
DCG1-800	800-1000
DCG2-070	66-88
DCG2-150	132-174
DCG2-460	406-512
DCG2-800	800-1000

System Cabinets and Accessories

PD543860 Open Rack
This vertical stacked open rack is used to mount transmitter combiner/receiver multicoupler systems and radio equipment. It measures 64-5/8 inches (1641 mm) high overall with base dimensions of 20-7/8 inches (530 mm) by 26 inches (660 mm) and weighs 80 lbs. (36.3 kg). Set of 4 casters optional, specify #044855900.

PD543740 Open Rack
This open rack is similar to the PD543860 except it measures 73-3/8 inches (1864 mm) high overall. Net weight is 89 lbs. (40.4 kg). Set of 4 casters optional, specify #044855900.

044855900 Caster Kit
Set of 4 casters and mounting hardware for PD543860 and PD543740.

PD543000 System Cabinet
These upright steel cabinets provide protection and security for transmitter combiner/receiver multicoupler systems as well as radio equipment. They measure 70 inches (1778 mm) high, 22 inches (559 mm) wide and 22 inches (559 mm) deep and are equipped with key lock front and rear doors for security. Cabinet weight empty is 216 pounds (98 kg).

PD543050 System Cabinet
This cabinet is offered for larger systems requiring more vertical rack space. It has the same dimensions as the PD543000, except the PD543050 measures 78 inches (1981 mm) high with 70 inches (1778 mm) of vertical rack space.

PD583050 Cabinet Fan Top
The cabinet fan top is offered as an option for both the PD543000 and the PD543050 cabinets. The fan provides improved air flow and cooling for systems operating in high ambient temperature or under high transmitter power.

A black plastic, injection molded impeller is shaped for optimum air performance with low noise and low power consumption to provide 530 CFM free air delivery.

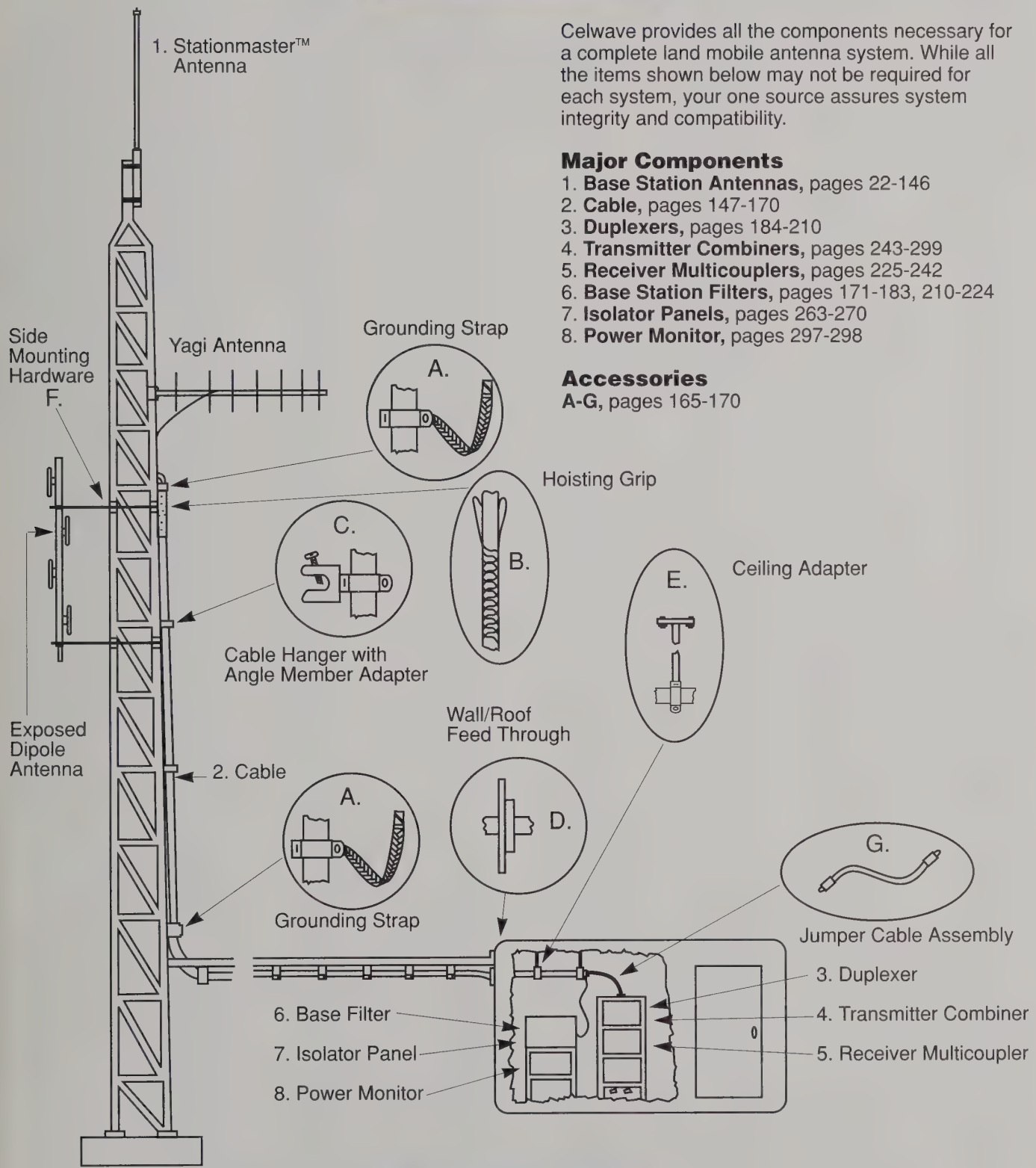
The UL® approved motor has an aluminum die cast housing which operates as a heat sink to minimize temperature rise. It requires a 115 VAC power source and operates over a temperature range of $^{-}22°F$ to $^{+}140°F$ ($^{-}30°C$ to $^{+}60°C$). Total weight 10 lbs. (4.5 kg.).

PD508000 Cable Assembly for System Cabinet Terminations
This cable assembly extends the transmitter/receiver input ports and antenna output ports to a location on the cabinet top panel. Type-N female bulkhead connectors are installed on the cabinet top to accept these input/outputs. The assembly includes cable, connector, installation and test of all components as a system.

The number of assemblies required for a system is the sum of the following:
1. Number of receiver inputs plus one.
2. Number of transmitter inputs plus one.
3. One additional cable if a duplexer is used.

IT600 Sampler
This sampler installs between the isolator and load assembly of a multichannel transmitter combiner. It facilitates periodic maintenance of active combining systems to be performed without having to turn off channels other than the one being adjusted or checked.

Two-Way Dispatch Systems



Celwave provides all the components necessary for a complete land mobile antenna system. While all the items shown below may not be required for each system, your one source assures system integrity and compatibility.

Major Components

1. **Base Station Antennas,** pages 22-146
2. **Cable,** pages 147-170
3. **Duplexers,** pages 184-210
4. **Transmitter Combiners,** pages 243-299
5. **Receiver Multicouplers,** pages 225-242
6. **Base Station Filters,** pages 171-183, 210-224
7. **Isolator Panels,** pages 263-270
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Accessories

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